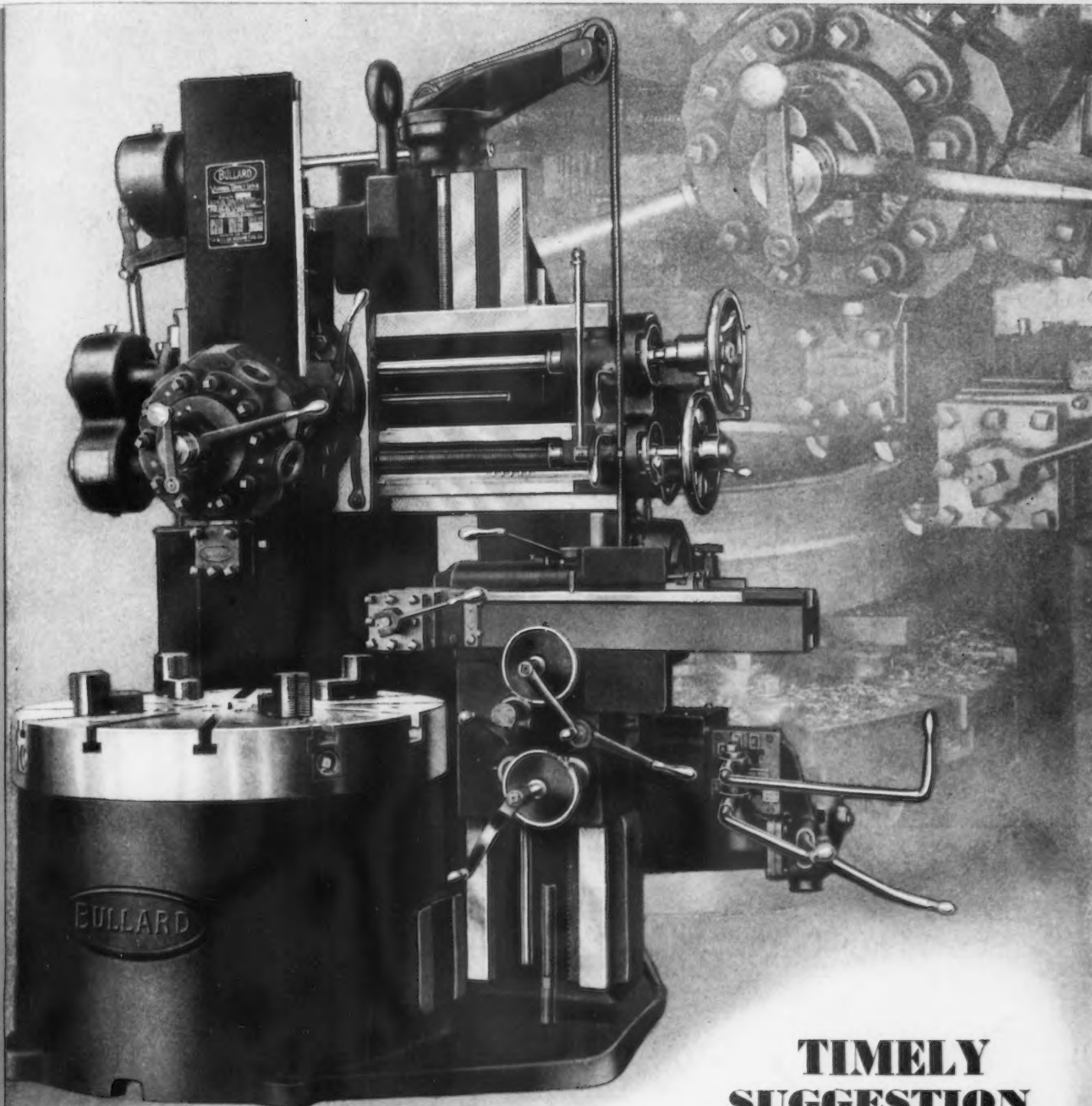


THE IRON AGE

PRODUCTION -- MANAGEMENT

MAY 17, 1934

PROCESSES -- NEWS



TIMELY SUGGESTION

Re-timing of your jobs for

Faster Times makes Better Times. Time reduction is Cost reduction. Bullard Spiral Drive Type Vertical Turret Lathes in sizes 24" — 36" — 42" — 54" and 64" afford a method for "Cutting Time Between Cuts."

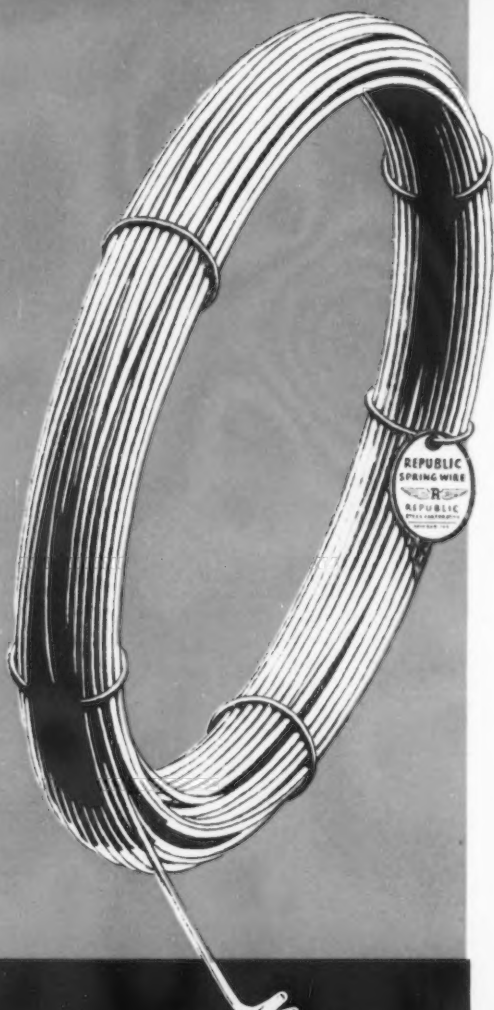
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THE BULLARD COMPANY

Bridgeport

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REPUBLIC *spring wire*



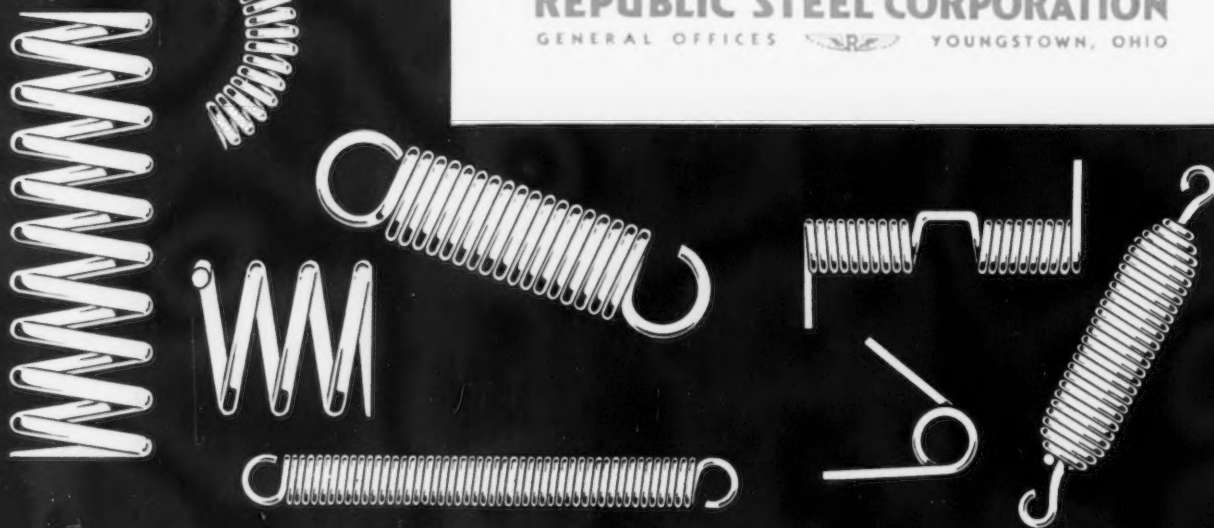
Many manufacturers have found by experience that Republic Spring Wire cuts manufacturing costs, lowers spoilage and improves the quality of the fabricated product. It is ideal for the manufacture of upholstery springs for furniture and automobiles, and for many mechanical spring applications.

It is furnished to suit each customer's requirements of tensile strength and temper, and finished to fit the work for which it is intended. It is made in 7 to 19 gauge in various sized coils, depending on the gauge.

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See Ryerson Stock List

THE IRON AGE

MAY 17, 1934

ESTABLISHED 1855

Vol. 133, No. 20

Give Business a Chance, Mr. Green



A YEAR ago industry was told that if it shortened hours the unemployment problem would be solved. The principle of spreading work was not new. It had been applied by steel manufacturers and other industrial groups since early in the depression.

But industry willingly went further. It not only created additional jobs; it boosted wage rates as well. In both the automobile and steel industries wage rates are now above 1929 levels, while employment is the largest in four years. The record of steel companies since last June reveals a 36 per cent wage rise and an increase of 80,000 workers, bringing total employment to 90 per cent of the 1929 peak.

TRULY an impressive achievement. But not enough, says William Green. Asserting that there are still 10,000,000 people out of work, he charges industry with being "unwilling to shorten hours sufficiently to absorb a really significant number of unemployed."

Mr. Green forgets that there are practical limits to the application of the spread-the-work principle. He seems to be unaware that an enterprise must have business before it can have work to divide.

Business, and the employment it creates, cannot thrive when there is chronic labor trouble. Already the automobile industry, which has been harassed by labor disturbances for months, shows evidences of having lost its manufacturing momentum. And dependent enterprises have suffered likewise, since

car makers have been unwilling to purchase tools and equipment with the threat of labor outbreaks constantly hanging over their heads. Thus, notwithstanding the stupendous efforts of a great industry to create work, the tactics of organized labor have destroyed work.

LABOR unrest is one of the two great obstacles to recovery. The other is the paralysis of private capital. The latter, of course, is partly due to the former. The unremitting drive to fasten the closed shop on industry has frightened capital back into hiding. And so have the onerous restrictions imposed by the securities act and the pending stock exchange bill. Private capital is not under Government control. Until it can be induced to take a business risk, it will continue to seek safety rather than profit.

Both capital and labor are essential in our economy. Capital, no less than labor, has a case that must be heard. And so long as the needs of capital are ignored, idle dollars will vie with labor turmoil in swelling the ranks of idle men.

BUSINESS men know this and they are not crying "wolf" when they say it. They have been good soldiers in the march out of the vale of despair, and it is their turn to be heard. To Mr. Green and to Congress they make one simple plea, "GIVE BUSINESS A CHANCE."

G. L. LACHER,

Managing Editor, The Iron Age.

Beer Barrel Industry Offers

It will require about 1,000,000 tons of steel to change the present wood beer barrel industry to steel construction, and many authorities feel that this change will be made within the next three years. While the initial difficulties have been great, the arguments in favor of the steel container for beer seem too strong to be ignored either from the point of view of sanitation or economy.

Beer essentially is a food, and metal containers in the food industry are universally popular. One enthusiast in the beer barrel industry, when questioned about the wood barrel, drew an analogy with the milk industry. "Beer," he said, "is almost as good a medium for the development of bacteria as is milk, yet who now questions the use of metal containers for transporting milk?"

Pitch manufacturers at first found

difficulty in producing a pitch which would adhere to metal. Now, however, the situation has been reversed, and new pitches applied after bonderizing or other preliminary treatment of the metal are said to hold up better than any pitches have done on wood. One authority states rather dogmatically that the latest product in steel beer barrels has a better pitch lining than would be possible with a wood barrel, and all at a first cost equal to that of the wood barrel, with a much longer useful life.

Steam Sterilization

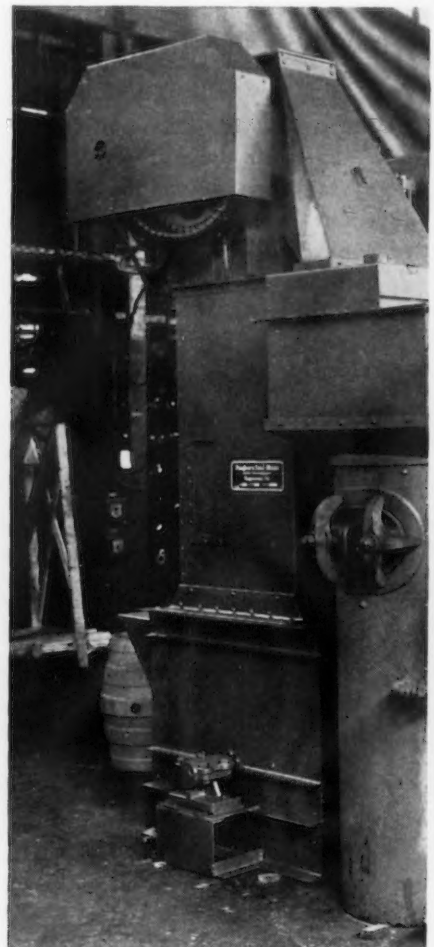
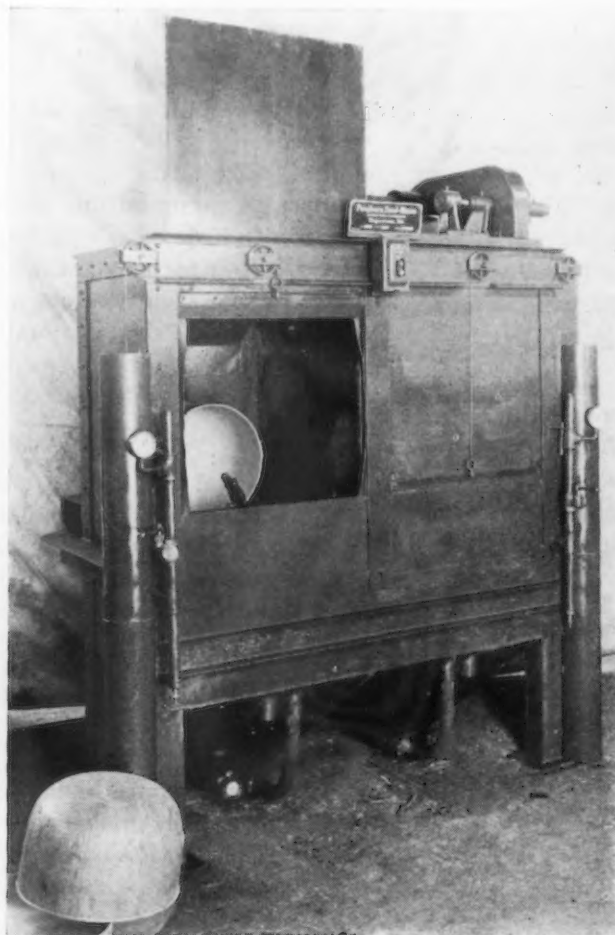
An important item from the sanitation point of view is that the new pitches in steel barrels can be steam sterilized. This, it is said, is not possible with the wood barrel. Of course the applying of a new pitch lining in a wood barrel affords an excellent

SOME manufacturers who have put in expensive equipment for the manufacture of steel beer barrels are inclined to think they have made a mistake. One manufacturer states quite frankly that "the steel beer barrel business is over

means of sterilization, but this is not done frequently enough to insure, of itself, sanitary conditions. An investigation among breweries showed that the average temperature of water used for washing wood beer barrels is not much over 100 deg. and this is claimed to be insufficient for sanitary cleansing.

The standard steel beer barrel, known technically as a half barrel, weighs about 60 lb. and costs about \$7.10. Peculiarly, the wood barrel weighs about the same amount, and

Thorough preparation of the metal surface makes possible a close bond between the pitch lining and the beer barrel. This shows a surfacing process on a type of beer barrel using metal liners.



Attractive Future Market ▲ ▲ ▲

and done with." Because of the wide interest in this subject on the part of steel producers as well as fabricators, The Iron Age presents in the accompanying symposium the results of an investigation made.

the cost is also close to \$7.10. Different designs in both types of barrels may cost slightly more or slightly less. The A. O. Smith Corp., Milwaukee, which is perhaps the largest producer, had a total output in 1933 of between 500,000 and 600,000 steel beer barrels and looks forward to much heavier business this year.

This company has had interesting experience in its attempt to supplant the wood barrel, but much of the criticism of steel construction which it has received may be summed up

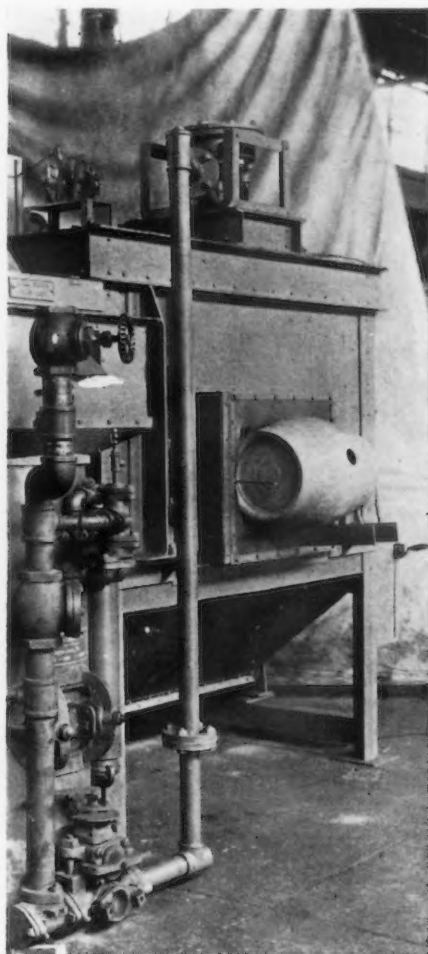
as prejudice. One large dispensing organization objected on the grounds of taste and was surprised to learn that, barring accidents, the beer never comes in contact with either the wood or the metal container. One wholesaler said he had enough difficulty selling beer without trying to sell a steel barrel as well. That the objection is largely biased is indicated by the fact that it appears in certain localities and is practically absent in other localities. At least one large brewery has adopted the steel beer barrel exclusively and has found no reduction in demand and a very substantial saving in handling cost as against the wood barrel.

Wood Barrel Faults

It is impractical to manufacture a wood barrel with as close a capacity tolerance as the steel barrel. For

instance, with modern machinery it is a relatively simple matter to make a steel barrel with a variation in capacity of less than a pint. The volume variation in new wood barrels on the other hand averages over a quart and increases with age. The capacity of most any wood barrel shrinks as it gets older. This is due to driving of the hoops to tighten the seams, and also to relining. It is not infrequent to find a wood barrel losing 1 gal. in capacity in two years.

Wood barrels are apt to leak, while a good steel barrel is practically proof against any leakage. Leakage is expensive, and not only is there the cost of replacement, but there are the government and state taxes amounting to about \$5 a barrel, which are paid on the leaking barrel as well as on the sound barrel, and which cannot be recovered. The longer life of the



▲ ▲ ▲
The Pangborn Corp., Hagerstown, Md., has built equipment for blast cleaning the exterior of beer barrels as a manufacturing process (center.)

This shows a type of machine used by the Stevens Metal Products Co., Niles, Ohio, for cleaning the interior of its steel beer barrels (at left.)



steel barrel is generally recognized, and now with the new pitches and stronger bond in the case of the steel barrel, the maintenance expense of the wood barrel jumps in comparison.

Wood Barrel Advantages

Despite these and many other objections to the wood barrel, some advantages are claimed and some steel fabricators view the future of the industry in anything but glowing colors. One manufacturer says:

"We find that it is exceedingly difficult to make the pitch stick to steel. We find that truck drivers object to steel because of difficulty in handling in cold weather."

Another says:

"It is undoubtedly true that the effect of a bare spot in the lining of wood barrels is less pronounced than in a steel barrel. If a bare spot as large or larger than a quarter appears through accident in a steel barrel, the beer will have a slightly metallic taste, whereas under similar circumstances it is extremely difficult to notice any change in taste in the beer from a wood barrel."

The Buhl Stamping Co., Detroit, a large manufacturer of steel beer barrels, says:

"The new barrel has naturally brought along with it several minor problems, and undoubtedly a good deal more education is needed before users generally will adopt this product. One of the chief problems is that of pitching. The old-time wood barrel pitch contains a large percentage of rosin which becomes hard and brittle when it cools down to 32 deg. This type of pitch does not successfully adhere to the inside of a steel barrel.

The pitch now being used on steel barrels after a preliminary bonderizing process contains approximately 20 to 25 per cent paraffin mixed with the rosin, which gives it more flexibility under heat and cold and at the same time gives better adhering properties. We feel that if the brewer will use the proper analysis of pitch in his steel barrels, and if he is careful to rim the tap hole and the bung hole afterwards and then thoroughly wash out the barrel, he will have no difficulty."

Another large manufacturer of steel barrels states:

"If the brewers had their way about it, that is, if they did not have to consider the wishes of others in the chain of distribution, our experience indicates that steel barrels would be preferred to wood. Distributors, how-

ever, as a class, are not favorably inclined toward the steel barrel. Whether this is prejudice or not, we do not know. Undoubtedly many brewers would like to use steel barrels but defer to distributors who prefer the wood. Early last summer some inferior barrels were put on the market and we believe this is responsible for much of the criticism.

"By far the greater part of the criticism of our barrel has come from those unable to pay for them on the due date. In other words, from the weaker and more poorly organized breweries. Much of the criticism is directed at the pitch lining. The pitch lining is not permanent in either wood or steel barrels, but some brewers buying steel barrels feel that the pitch lining should never come off.

"This boils down to the fact that neither the wood nor the steel at present is a perfect container for the use to which it is put. The rapid advance in the development of pitches and of bonds between pitch and steel

seems to point to a future steel barrel with a permanent lining."

To anyone familiar with the remarkable advance made in coating of metal during the past two or three years, the early development of a suitable and permanent pitch lining in a steel barrel seems assured.

Advantages of Steel

Some of the advantages listed by the A. O. Smith Corp. for its steel beer barrel are as follows:

It stacks and rolls as easily as wood.

It is more readily and thoroughly sterilized.

It has no crevices or cracks or leaks and it holds in carbon dioxide.

It is practically indestructible and has uniform weight and volume.

It can be painted in any color and makes a far more attractive package than the wood container.

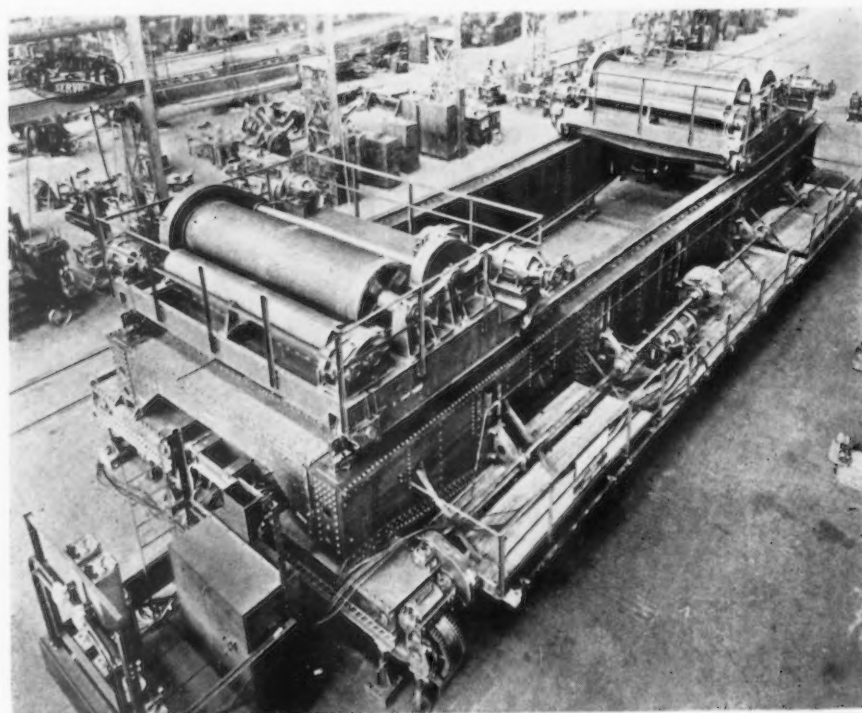
It is furnished pitched and ready for use and galvanized outside.

To Build Large Cranes For Boulder Dam

THE Harnischfeger Corp., Milwaukee, has been awarded the contract for five electric traveling cranes—one 50 ton and four 300-ton—for use at Boulder Dam. This award, probably the largest in the electric crane indus-

try in the past five years, is said to total approximately \$250,000.

The four 300-ton units are equipped with two 30-ton auxiliary hoists. They are of the double-trolley power house (Concluded on page 62)



Four 300-ton cranes of this type will be used for handling the huge electrical rotors at Boulder Dam.

First 30-Ft. Bend Sections Com- pleted at Boulder Dam



THESE views show the largest bend sections ever made of rolled steel.

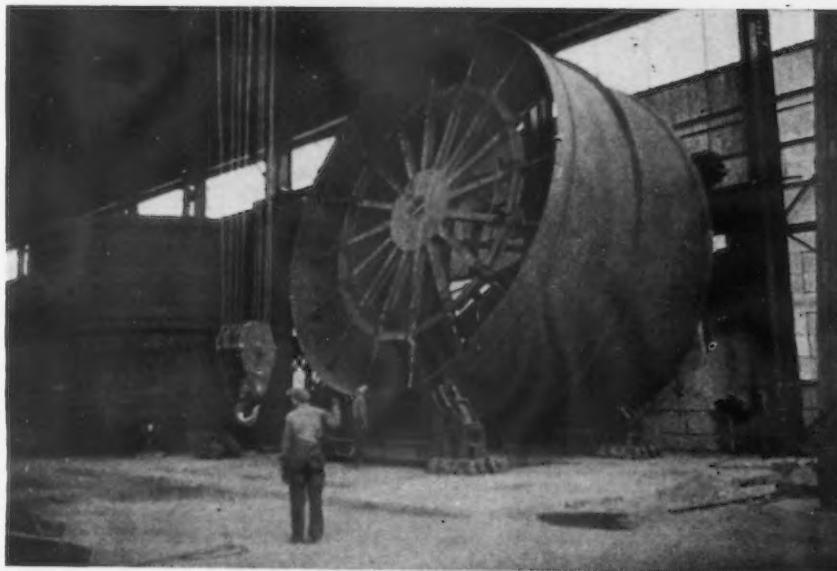
They will form part of the 30-ft. penstock installation at Boulder Dam. The construction of these large pipes at the field plant of the Babcock & Wilcox Co. was fully described in *THE IRON AGE* of Nov. 9, 1933.

At the top is shown a fusion-welding operation after the manner employed to weld the straight sections. A conventional machined U-groove and flux coated electrodes are used, and a Babcock & Wilcox special 36,000-watt a.c. automatic welding machine is used for all of the welding operations. Every inch of weld is inspected by 300,000-volt X-ray equipment, and, if sound, the bend sections are stress-relieved in a specially designed hot gas furnace.

In the center is shown a general view of the first 30-ft. bend section. The internal hydraulic spider inside is used during fabrication to obtain perfect alinement and to prevent distortion until stiffening rings can be shrunk on and tack-welded in place.

The lower picture illustrates the handling methods used for the bend sections. A special rigging is used with two 75-ton cranes to transfer the bends from one section of the plant to another.

The 30-ft. bend and straight sections will comprise a portion of the 15,000 ft. of pipe which will form part of the Boulder Dam power installation. Water from the Black Canyon above the dam will thus be directed through the canyon walls to the 1,800,000-hp. turbines located below the dam structure.



Records Roll

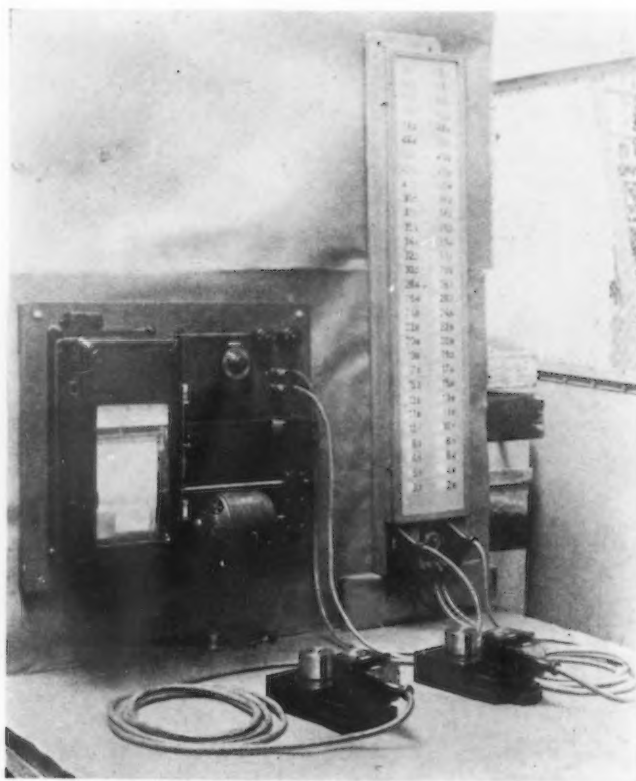


Fig. 3—Two plate power testers with lamp box and recorder.

PRESSURE developed in rolling causes a movement of a column of mercury. This in turn closes an electric circuit in which there is an electric lamp. The illumination of a given lamp becomes a measure of the height of the mercury column and therefore of the amount of the pressure. Besides the instantaneous pressure information afforded by the electric lights, arrangement is made for recording the pressure fluctuations.

RECORDING apparatus for giving instantaneous and also continuous indications of pressures in rolling mill operations is described as follows by René W. P. Leonhardt, consulting engineer, Berlin, Germany:

In rolling mills constant supervision and control of the pressure developed during the rolling process should be required in order to insure the smooth working of the plant and the maintenance of the prescribed maximum output. If control apparatus are used for this purpose they must be readily adaptable to local requirements, be suitably equipped to permit of distant readings and, if necessary, to give a continuous record of the results.

A measuring device of this kind for ascertaining the pressure in rolling mills is provided by the elastic plate power gage described below, in which the pressure indicating devices as well as the recording devices are designed in an entirely new and interesting manner.

The pressure indicating devices are arranged between the upper roll and a counter-bearing. In essence they consist of a closed box which is filled with mercury and from which all air is exhausted. The upper pressure plates are constructed of special high-grade steel which at the same time is highly tenacious and elastic. The

base plate 1, Fig. 1, with the gage plates 2 and 3 and the spherical plate 4, is placed on a support which should be as horizontal as possible, while a deficiency in the parallelism of the supporting surfaces is compensated by the spherical plate 4. In addition to the gage plates the base plate also carries the contact column 5, which is protected by the hood 6. The contact column has a vertical bore which opens into the pressure chamber of the box.

Before starting the apparatus, the closing screw 8 is removed so that no resistance is offered to the mercury rising under pressure in the contact column. The gage plates are subjected to deformation as a result of the load exerted on them, and the mercury forced out of the pressure chamber ascends the contact column. Thus the underlying idea is to measure the modification in the volume of the hollow space inclosed by the pressure and gage plates. As the volume of the box is very large in relation to the volume of the mercury column, even a slight bending of the gage plates will cause the mercury to rise sharply inside the contact column and consequently provide a reliable indication of the various degrees of load by lighting the lamps in the lamp indicator device connected to it.

To safeguard the apparatus against

the action of temperature variations, the mercury container is provided with a regulating device which serves to effect the zero setting when starting, as well as the further adjustment if any variation should arise later. This is done by displacing a piston which projects into the pressure chamber, by means of a nut 13. The volume of mercury, which varies according to the temperature, is thus accurately adjusted by means of the piston.

The contacting operation of the rising mercury column proceeds smoothly and is perfectly reliable. The contact column is connected to the lamp box which carries 32 lamps in all, 30 of which serve to indicate figures, one to indicate the zero stage and one red "stop" lamp to indicate the maximum load. The 30-lamp fields directly indicate the load expressed in tons.

The distant indicator offers the special advantage that even several lamp boxes connected to a power gage can be installed at any desired points in the works. The consumption of a lamp is about 0.1 amp., so that the total consumption of the whole lamp box when indicating the maximum permissible load is approximately 3.2 amp.

Generally, a 4-volt direct current will be obtained from an accumulator

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Pressures Electrically



for the operation of the apparatus, unless alternating current is supplied by the mains and passed through a transformer.

The lamp boxes are supplied in three different designs, viz.:

- (1) For stationary plants with one power gage.
- (2) For stationary plants with two power gages and two rows of lamps.
- (3) For portable measuring apparatus of very small and light design.

The design mentioned under No. 2 is particularly adapted to taking readings on rolls in which the load exerted upon the two roll bearings is not the same, for reasons connected with the operation of the plant.

The load indicated by the lamps is recorded in a simple manner by measuring the consumption of current by the lamps. The recording, in writing, of the load is therefore independent of the visual indication, and its re-

sult. In this way, a secondary error in the recording of the measurement taken is prevented.

The special ampere recorder used for recording the measurement curve thus operates in perfect synchronization with the visual indicator. A feature of the recorder is its paper feed, which can be adjusted to speeds varying between 1 and 10 mm. per sec.,

and the low setting time of its recording lever, the throw of which covers the whole scale from zero to the maximum value within 0.2 sec. Variations from the actual figures due to lag on the part of the recording lever are not noticeable.

The connection with the lamp box is established by the plug 10, Fig. 1; if the recorder is dispensed with, the

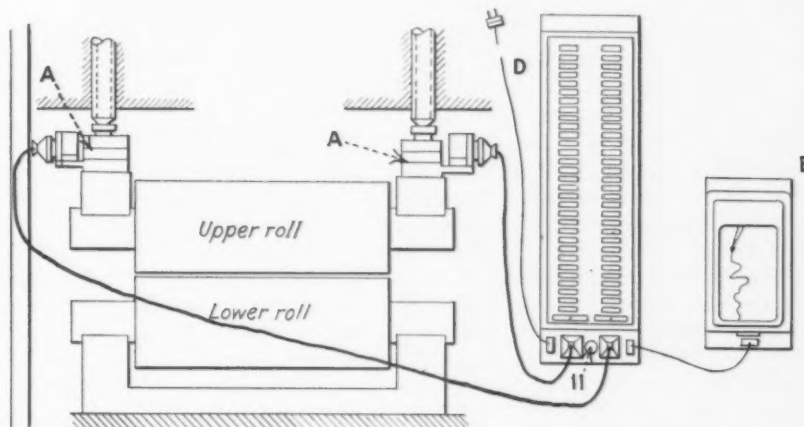


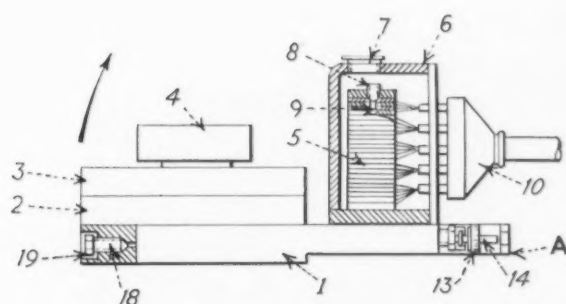
Fig. 2—Diagram of the recording plant, with the power testers, A, A, fitted to receive the pressure at both ends of the upper roll, and with a lamp box, D, for indicating the pressure and the recorder, E, for making the autographic record.

plug 9 is provided for connecting to the current supply.

The installation described has been developed by Losenhausenwerk A. G.

An ingenious demonstration of the P. & H-Hansen arc welder will be the principal feature of the 1934 exhibit of the Harnischfeger Corp., Milwaukee, at the Century of Progress. This company is one of the many exhibitors which is enlarging its displays at the Chicago fair this year. Housed in the Travel and Transport Building, the large degree of interest shown in this arc welding demonstration last year has led the company to provide a special colored glass booth so that spectators may watch these fascinating operations without blinding glare. The operator, completely inclosed in this booth, will have a tiny microphone placed within his welding mask and hooked up with a public address system so that operations may be explained step by step.

The Iron Age, May 17, 1934—17



- 1 - Base plate
- 2 and 3 Gage plates
- 4 - Spherical plate
- 5 - Contact column
- 6 - Hood
- 7 - Screw
- 8 - Closing screw for mercury channel
- 9 - Bore for mercury column
- 10 - Multiple plug
- 11 - Plug for current supply
- 13 and 14 - Adjusting screw for pressure chamber volume
- 18 - Closing screw
- 19 - Inlet port for mercury

Fig. 1—By inserting so-called testing plates in the roll housing, the amount of the rolling pressure is ascertained by the lift of a column of mercury against a series of electrical contacts.



Metallography Controls Steel



PROCESS control in which metallography is an essential part features operations of the plant at Buffalo, N. Y., of the Wickwire Spencer Steel Co. As described by T. A. Bissell after consultation with B. L. McCarthy, chief chemist and metallurgist of the company for the past 18 years, and with the Bausch & Lomb Mfg. Co., which supplied the metallographic equipment, the procedure is as follows:

Routine Tests

All heats of steel above 0.3 per cent carbon and many heats below 0.3 carbon are classified for normality and inherent grain size by means of the McQuaid-Ehn grain size test as follows:

The sample from the heat first is carburized at 1700 deg. F. for 8 hr. and allowed to cool slowly in the furnace. The result of this treatment is that the grain is clearly outlined by the precipitation of free cementite. After the sample has been polished and etched to bring out the contrast in the microstructure, a photomicrographic picture is taken of it at 100 diameters magnification.

The routine check for normality is an observation for free ferrite and free cementite. The McQuaid-Ehn grain size test consists in counting the number of grains per square inch. To facilitate this operation, each picture

taken for this test is developed to give a circle of an area of 9 sq. in. First the grains intercepted by the border are counted and divided by two. When this number is added to the number of grains not intercepted by the border and the result is divided by nine, the number of grains per square inch at 100 magnifications is obtained.

This inherent grain size is a quality given the steel in the open hearth. It is important because it influences greatly the final or manufactured grain size that it is possible to obtain, as well as the response of the steel to various heat treatments.

Cold Working and Annealing

The metallographic equipment is used to determine the presence and points the way to the elimination of hard micro-constituents in the wire that impede the flow of metal in wire drawing and cause defects. It is well known that drawing hardens the wire, sometimes to a point where the wire breaks on further drawing. Frequently, the photomicrograph of such a sample will show that it is necessary to anneal between draws to re-soften the steel.

The property of a metal to withstand cold working without becoming brittle is termed its cold working property. This cold working property can either be increased or decreased by

heat treatment depending upon temperature and other conditions.

Metallography is employed to control the heat-treating processes to obtain the desired cold working properties. For example, a globular cementite and free ferrite structure flows easier and more uniformly in a low carbon steel (below 0.3) than does a structure containing pearlite. Annealing steel with such a pearlite structure at the right temperature below the critical breaks up the cementite into globules. Although these globules will not deform, they flow with the ferrite. Figs. 1 and 2 show the desired globular cementite structure.

A very important application of the metallographic equipment is the control of the structure of high carbon steel before cold drawing, the so-called patenting process. The material is heated to a temperature in excess of its critical point and, by regulating the speed of the quench, the resultant microstructure is controlled. It has been found that a structure of sorbitic pearlite is most desirable; and that steels containing laminated pearlite are not in the best condition for cold drawing.

Other factors that influence cold working properties can be checked back to the manufacture of the steel itself by the facts brought out by the photomicrographs. For example, de-

Steel Wire Manufacture

fects in the hot-rolled rod, such as seams and pipes, seriously hurt the cold-working properties because, more important than the defects themselves, is the fact that they usually indicate segregation.

Miscellaneous Research

In addition to the research work mentioned, the metallographic equipment is used to study the non-metallic inclusions in steel and also axial segregation and its relation to wire drawing. Attempts also are now being made to detect minute martensite by the use of Wratten No. 87 infra-red filters in the metallographic equipment, giving better resolution by means of a shorter wave length of light.

Photomicrographic pictures of the zinc-iron alloy and the alloy layers developed in galvanizing, are employed as a guide to a close control of the speed and temperature employed in galvanizing.

Metallography is used to control the manufacture of oil tempered wire. The desired structure is sorbitic-troostite. The nature of the martensitic structure must also be ascertained in the hardening treatment prior to tempering.

Customers who have no metallurgical department or equipment of their own are offered the facilities of the

chemical and metallurgical department to assist them in a solution of their special problems.

The Metallographic Equipment

The metallographic equipment itself is an integrated unit, made up of a light source, filters, condensers, liquid cell, microscope with observation eyepiece and specimen holder, and camera. The assembled parts are mounted on a table through four shock absorbers, each unit of which is made up of a frame, coiled spring, and rubber damper. To simplify operation the illuminating system, microscope and camera are mounted in permanent alinement.

Mr. McCarthy has made up a chart listing the objectives, eyepieces, bellows length, and length of exposure necessary for maximum resolution in the desired range of magnifications. First the camera bellows is set by reference to the setting on the chart for the desired magnification. Next the objective and eyepiece is selected from the same line on the chart and placed in position. The mechanical arc lamp is turned on and the operator centers and focuses the light by adjusting the condensers and iris diaphragms.

After the specimen is in place under its clip, the operator adjusts the microscope for maximum resolution. This operation is accomplished by looking

through the eyepiece and manipulating coarse and fine adjustment screws. After he has obtained the best resolution possible on the coarse adjustment, which moves the stage holding the specimen away from or toward the specimen, he manipulates the fine adjustment, which moves the objective to or away from the specimen until he obtains maximum resolution. With the light focused and maximum resolution obtained, he pulls the eyepiece out of the camera's line of vision, swings a green filter into the path of light, and exposes the plate for the time indicated on the chart. Mr. McCarthy has checked the vibrationless feature of the equipment by camera exposure of as long as 1 hr., 15 min. The plate produced photomicrographs that are sharp and rich in detail.

In Mr. McCarthy's words: "The use of metallographic equipment and our development of steel metallurgy have given us a control of manufacturing processes which could not be obtained in any other way, which control is absolutely essential to the successful manufacture of wire under present requirements and conditions. This complete control of processes is the greatest benefit derived from the use of metallographic equipment. From it spring such benefits as higher quality, reduction of rejects and complaints, and the ability to meet exacting specifications."

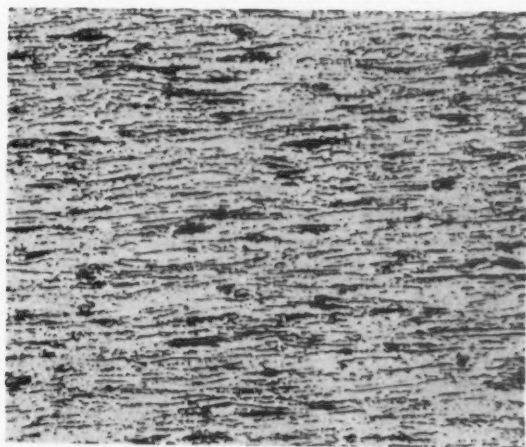


Fig. 1—Longitudinal section of cold drawn, low-carbon steel, showing crystal elongation as a result of cold working.

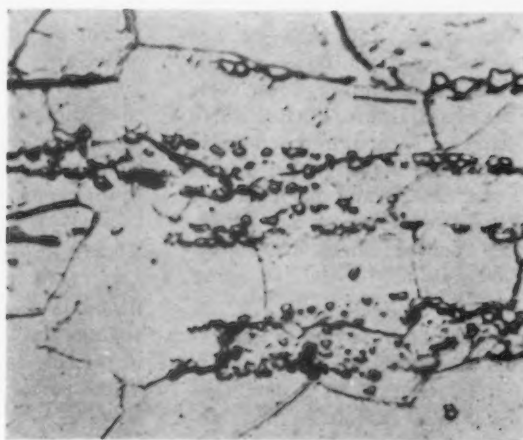
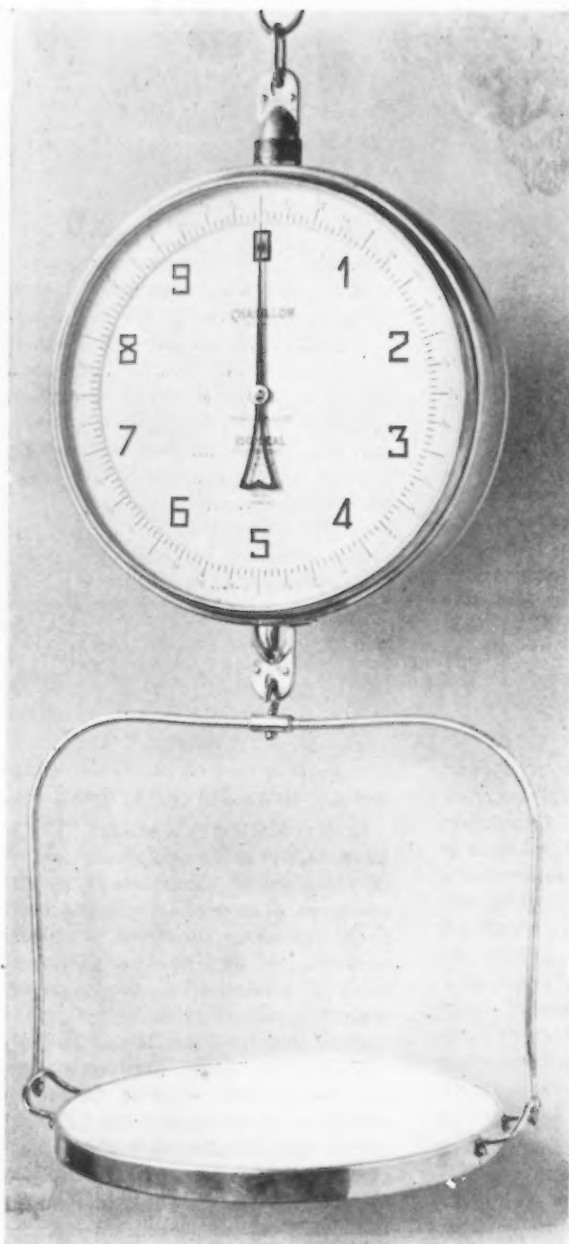


Fig. 2—Globular cementite structure in annealed low-carbon steel, magnified 200 diameters.



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The heart of the scale is a group of helical springs of Iso-Elastic flat wire. The dial of the scale is recessed so that the indicator pointer lies in the plane of the graduations, thus to eliminate the so-called parallax error.
▼ ▼ ▼

REVOLUTIONARY findings in spring design and behavior are reported by technicians on the staff of John Chatillon & Sons, New York scale manufacturers, after a five year research. Although the definite objective of their investigation was to improve the design and performance of spring-actuated weighing apparatus, they believe their discoveries will have wide application in other industries.

"The direct result of this investigation," said George E. Chatillon, president of the company, "is a new kind of spring scale, combining the accuracy of a precision instrument with the reliability that comes from simplicity and strength of parts, and economy both in first cost and weighing time. This direct success, as might

be expected, represents the sum of numerous discoveries, especially in metallurgy and in the art of spring-making. It safely may be assumed that these discoveries in the field of springs, and in mechanisms associated with spring scales, have uses other than in weighing apparatus. What these may be is a subject into which we have only begun to delve."

In 1678 Robert Hooke, first published in London the basic theory of springs in which he set forth what physicists know as the Hooke law: "The power of any spring," wrote Hooke, "is in the same proportion with the tension thereof: That is, if one power stretch or bend it one space, two will bend it two, and three will bend it three, and so forward."

Despite its publication in text

New Facts

WHAT exhaustive research will accomplish is well shown by the extended investigations of the Chatillon weighing scale makers, here reported in brief. New facts about both springs and spring scales were revealed, and a helical spring has been evolved that is an instrument of precision, substantially unaffected by temperature, creep effect or hysteresis. In a word, by using a material of constant elastic characteristics (aptly given the name Iso-Elastic), properly cold worked and heat treated, and by fashioning the material in the form of a flat wire of a cross-

books, with footnotes referring to deviations, the Hooke law—when applied to helical springs—has a serious flaw, explained Robert B. Wasson, engineer who directs the Chatillon research work. "One of the main problems in our investigation," said he, "centered around the deviations from the Hooke law which are found in conventional helical springs. The Chatillon company is nearly one hundred years old. Going back into the company's records, we found that several generations of technicians had accepted the errors and deviations in the Hooke law as inherent and inescapable. Every important development in our product, and I believe in the entire spring scale art, has taken the form of correcting or compensating for these inherent errors. So far as we know, the present investigation is the only comprehensive and successful attack on the fundamental errors in Hooke's law as applied to the use of helical springs."

Inherent Errors in Hooke's Law

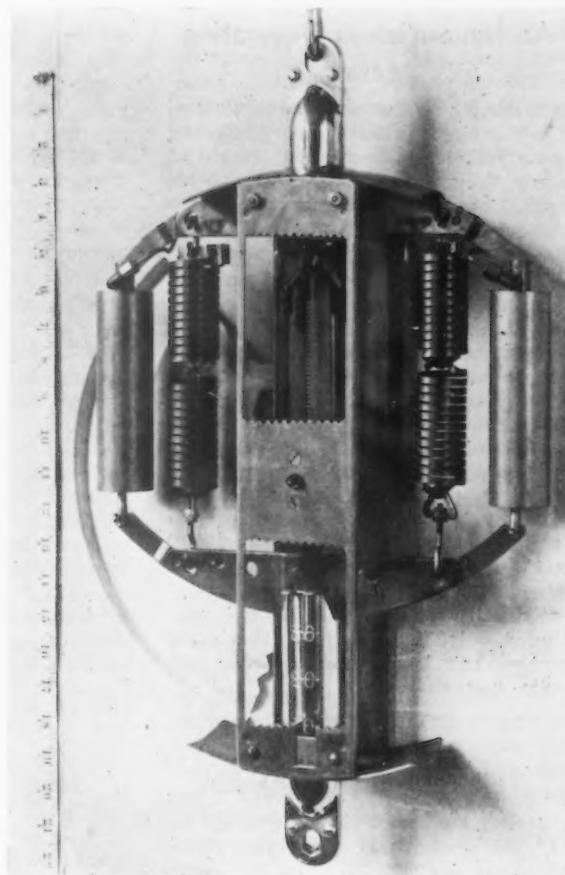
To clarify the accomplishments of the investigation, Mr. Wasson placed the inherent errors with which the research dealt into four classifications, as follows:

Temperature Error: When cold, the ordinary spring is much stiffer than when warm. Many types of tem-

About Springs

section found mathematically self-correcting in respect to the elements that cause a deviation from the Hooke law (which states that extension is strictly proportional to load), a spring has been produced that promises a wide field of usefulness, such as incorporation in precision testing machines as well as in weighing scales. And withal, the springs are made under modern assembly-by-selection methods, with the elimination of the handicraftsmanship that required adjustments of each assembly to minimize departures from Hooke's law.

▲ ▲ ▲
The spring material, a nickel-chromium-iron alloy specially cold worked with definite after heating, and the proportions of the spring comprise a combination serving to control the secondary bending effects in a way to make Hooke's law a fact and the springs an instrument of precision.
▼ ▼ ▼



perature compensation have been proposed, and several are in use. A thermostat changing the leverages or altering the amount of active spring metal is common in the spring scale art.

Straight Line Error: To Robert Hooke, with his limited means for observation, it appeared that a helical spring extended proportionally to the weight applied, from which he deduced his general law: "As the weight, so the extension." Modern measuring devices detect deviations. With conventional proportions, a spring which elongates 2 in. with a 2-lb. load may elongate 1.005 in. with a 1-lb. load. The deviation will vary with spring proportion and materials. In the simple type of direct-reading spring scale, the error is undetected by the eye; but in such types as a two-revolution scale, where the error is multiplied approximately 30 times by the indicating mechanism, a deviation in the spring's action of 0.005 in. becomes of practical importance. To produce accurate readings, in the face of the straight line error, the spring scale maker in the past has had to resort to adjustment and hand correction of each individual scale by highly skilled workmen.

Creep Effect: This causes a spring to elongate under continuous load. The usual test for this error in a

spring scale, and one frequently used by weights and measures inspectors, is to apply a full load during 24 hr. The apparent change in the load with steel springs may amount to 5 parts in 1,000. As the greater part of the creep occurs in the first few minutes, the error after five minutes may reach several tenths of one per cent.

Hysteresis and Back Error: Like the creep effect, hysteresis and its interrelated back error represent a departure from the desired elastic behavior of the spring. Quite apart from the creep effect, metals absorb energy when strained even within their elastic limits. Because of hysteresis, accurate measurements detect a smaller elongation in springs when loading than when unloading. This error in conventional springs varies widely, and errors of more than 2 parts in 1,000 are frequently found.

Steps Taken to Eliminate the Errors

"Accurate spring scales have been made for decades," stated Mr. Wasson, "despite these four inherent errors. It occurred to us, however, that if we could effectually do away with these errors we would automatically eliminate the need for temperature compensation devices, for hand correction, and other means employed in the spring scale art for offsetting the deviations in Hooke's simple statement

of what he believed to be the truth about helical springs.

"To put our objective in another way, success did not come through proving that the Hooke law is wrong. One of the main achievements was in the invention of a spring which proves Hooke was right. This new spring, made by commercial methods, sweeps away a whole series of formidable difficulties because it conforms under widely varying conditions to Hooke's law. Here, after 250 years, is a helical spring which actually and practically stretches one space under one power, two spaces under two powers, and so forward."

To eliminate the temperature error, research developed a new and practical spring metal having a modulus of elasticity that is unaffected by wide changes in temperature. Guillaume, the French metallurgist, years ago discovered an alloy of this character. This discovery was a development of the better known "Invar," which is an alloy of 36 per cent nickel with iron having a very small coefficient of expansion. Invar becomes stiffer with increased temperature, where ordinary spring material becomes stiffer with decreased temperature. The use of Invar had been previously considered as a compensator in a spring system of conventional type; but the related

(Continued on Page 70)

An Innovation in Decorating Metals

PROBABLY the most unique and yet simple process for producing beautiful decorative metal work of many kinds has recently come to light. By it intricate or simple lace patterns can be reproduced on metals. Briefly, the method is as follows:

Take any lace or similar pattern. Impregnate the threads with rubber—that is, rubberize them. Then place this rubber impregnated lace pattern over a metal panel or slab, or what not. Sand blast this. The result, after removing the pattern, is a reproduction on the metal. Thus any lace or similar pattern can be reproduced on polished stainless steel, on monel metal, on brass or copper, and so on. The rubberized pattern will last quite a time but, unless broken here and there, it can be again saturated with rubber and its use continued. It is said that the same process can be applied to wood and other materials.

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Tellurium and Selenium

MORE and more is being heard of the rare metal tellurium, which for years has lain buried in the dump heaps around copper plants. The recovery of tellurium from such waste and other sources during the four years of the depression has been about four times that of the prosperous years preceding. It all came about, says Dr. Colin G. Fink, through a discovery by a scientist that "small additions of tellurium to the zinc electrolyte facilitate the elimination of the very objectionable cobalt impurity."

Electrometallurgists of the copper industry and others have electro-deposited tellurium plates $\frac{1}{4}$ in. and more in thickness. There is a possibility that a use may be found for tellurium plated metals.

Selenium, too, is coming into its own. This element is found in copper ores also and appears in the by-products of the electrolytic copper industry. It is being recovered and sold by this industry largely to the glass industry. Here it forms the basis of the familiar red glass of traffic and other signals. Formerly the only commercial use was for the selenium photocell.

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Akuroid, a Precision Hot Rolled Steel

UNDER the class of precision steel but given the trade name "Akuroid," a hot-rolled product is being produced which has nearly the accurate dimensions of cold-drawn steel—at least it is quite close in the way of tolerances to the cold-drawn material. It is being made in all the regu-

New Things in Materials and Processes

By EDWIN F. CONE

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lar alloy grades of steel, but is limited for the present in a range running from approximately $\frac{7}{16}$ in. in diameter up to $2\frac{1}{2}$ in., in rounds only. The tolerances are somewhat different for the different sizes, running from a total of 0.007 in. to a total of 0.016 in.

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Germanium, Gallium and Indium

CORRESPONDING facts to those related above apply to by-products of the zinc industry. Certain metals so obtained are taking, or are likely to assume, an important role in future developments.

Of course, cadmium is prominent among them. It has taken a leading place in this family of metals industrially, but more so in quite recent years. But besides this metal there are also three less well-known ones—germanium, gallium and indium. These are all awaiting a use and a market, says Doctor Fink.

Promising results have been achieved from the electrodeposition of indium, particularly on silver. Gal-

lium emits electrons at lower temperatures than other metals and offers valuable applications in this field. Germanium will probably be available in much larger quantities than has been ever anticipated.

Aside from the individual use of these three metals, per se—germanium, gallium and indium—until now generally looked upon as outsiders, the "biggest promise of the future appears to be in compounds of these three." It is suggested as possible that a compound of two of the metals may produce a dye for cottons and silks that will not bleach out in the sun—that will withstand the action of ultra-violet rays. "The best outlook for fast and wash-proof dyes will be in those of mineral origin or composition."

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Copper Stools and Ingots

SEVERAL references have been made in these comments from time to time to the use of copper ingot molds and stools for steel mills. It can now be reliably stated that several steel plants have been using the copper stools with considerable success.

The results seem to have been as follows:

The use of the copper stool, on which the usual iron ingot mold rests, insures a much smoother surface for the end of the steel ingot. The fact that the heat is much more rapidly conducted away from the steel and the mold by the copper stool is found to increase the life of the ingot mold itself quite decidedly. The life of the copper stools, as compared to the cast iron stools, is said to be much longer. The advantages are believed to offset the extra cost of the copper stool.

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Dopploy, a New Alloy Gray Iron

A NEW alloy gray iron has appeared under the trade name Dopploy. Recognizing the need for a material of broader utility than the special close-grained, high-tensile iron which it had been making for years to incorporate in its heating, cooling and mixing equipment, the Sowers Mfg. Co., Buffalo, N. Y., has developed a nickel-bearing alloy which has been given the name mentioned, Dopploy.

Enough nickel is put in the regular gray iron to impart to it the general characteristics of the austenitic irons, similar to Ni-Resist. Besides its unusual resistance to the effect of heat and the way it resists corrosion by a long list of acids and alkalis, the new alloy is described as providing protection against discoloration or contamination of caustics and similar chemicals, since it contains no copper.

It has been found by an independent investigation that Dopploy will resist the corrosive effect of boiling sulphur chloride. High-grade gray iron is easily attacked by this agent. The new alloy resisted the attack of boiling sulphur chloride for a period of 119 days of uninterrupted testing without any loss of weight.

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Chapmanizing—A Correction

IN THE IRON AGE for April 19, in these columns, a typographical error was responsible for the reading of the depth of case as 0.0020 in. It manifestly should have been 0.020 in.

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Larger Use of Copper Steels

NO little interest was aroused by the publication in the March 15 issue of THE IRON AGE of the article describing the new copper-silicon-

chromium alloy steel castings used as crankshafts in the Ford V-8 car. These are manufactured by the Ford company in its own foundries. The composition is a distinct departure from the conventional alloy steels having a carbon content of around 1.40 per cent. The properties of this steel are excellent and fully equal to the demands made on the use to which it is being put. Many crankshafts of this alloy steel are in successful use, it is stated.

The fact that there is about 2.50 per cent copper in this new alloy steel casting emphasizes the wide use of that metal in alloy steels. Besides the familiar and old copper bearing sheet and plate steel, there are several products, rolled, forged or cast, made of a 1.00 to 1.25 per cent plain copper steel. I am informed that the Ford organization is one of the largest users of copper steels. At least one-third of the brake drums used by this company in its various automobile units and trucks are of 1.00 to 1.25 per cent copper steel.

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Aluminum Foil for Heat Insulation

A MOST interesting and novel use for aluminum foil has been established. It is being used as a heat insulator in houses and it is proposed to use it as an insulator for steam pipes and the like.

The story is as follows: Aluminum foil, of a thickness of 0.0045 in., is prepared in the corrugated form. This insures greater surface exposure for a given space. It is placed under the sheathing of a house or in any location where insulation is usually applied in such a building. The aluminum foil of course takes up practically no space at all. It is stated that to insulate the average house the aluminum foil necessary can be obtained at a cost of not over \$30 to \$35.

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High-Cobalt Magnet Steel Castings

COBALT permanent magnet steel in the form of castings is a relatively new development, at least on a commercial scale. Castings of a cobalt steel, running as high as 38 per cent cobalt and containing tungsten and chromium in small percentages, are being made today. The production of these complicated analyses as castings is not a simple matter—not so easy as plain carbon or low alloy steel cast-

ings. Most of the inherent difficulties of foundry practice and heat treatment have been overcome. Fairly complicated shapes are being made for several industrial uses, particularly in the radio and related industries.

Columbium and Titanium Ferroalloys in Europe

MARKED interest has been awakened lately in metallurgical circles in the use of columbium and titanium, and perhaps tantalum, in the high chromium and chromium-nickel steels. This interest has been intensified by the publication last October and February of two papers by Dr. F. M. Becket and Russell Franks of the Union Carbide & Carbon Research Laboratories, New York, referred to in these comments at the time.

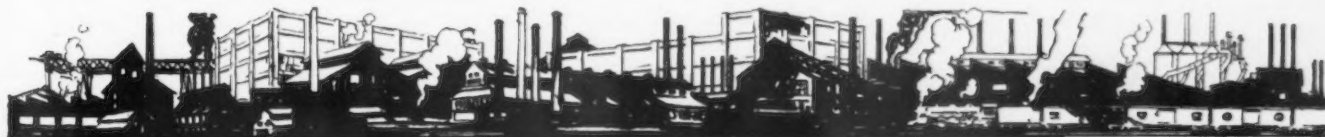
From England comes the announcement from a metallurgical company in Liverpool that it is prepared to furnish ferrotantalum-columbium (niobium), containing up to 80 per cent Ta-Co and "carbon free." The company also states that substantial quantities are being sold to European steel companies. It also offers "carbon free" ferrotitanium, containing 20 to 25, 25 to 30, and 30 to 40 per cent titanium.

The same or similar ferroalloys are, of course, obtainable from American manufacturers. The above announcement is further proof of the widespread interest in these products, reflecting the progress of foreign research. Significant also is the fact that this British circular quoted from one of the Becket-Franks papers on the efficacy of these alloys.

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Aluminum from Clay and Iron Ore

THE recovery of aluminum on a commercial scale from ores other than bauxite may be expected in a comparatively short time, according to Dr. Colin G. Fink, head of the department of electrochemistry, Columbia University. It is understood that in Norway a combination process has been evolved which utilizes iron ore and clay to produce an alumina containing slag from which the metal is subsequently recovered. Details are not yet forthcoming. When such a process is perfected, the metal should be more abundant, with accelerated expansion of use, "probably at the expense of other metals."



Choosing the Right Drive — 11

By WILLIAM STANIAR

Mechanical Power Transmission Engineer
E. I. DuPont de Nemours & Co.

THE translation of a body from a state of rest to one of motion requires gradual power application. This translation cannot be accomplished in any other manner without causing excessive wear and tear and possible destruction to the mechanisms involved. This law which is load resistance to acceleration of speed is mechanically known as "torque," or as the Standard Dictionary states, "torque is the moment of a system of forces that causes rotation."

The mechanical transmission of power has always involved starting torque, but prior to the introduction of the high-speed electric motor, high ratios and direct connection, the gradual acceleration of the steam engine and the slipping of belting both re-

duced to a certain extent the effect of this law of physics on the driven equipment. The principle of "torque" must be understood and seriously considered in modern mechanical power transmission; otherwise inconsistent specifications, power requirements and a poor selection of power transmitting machinery will result.

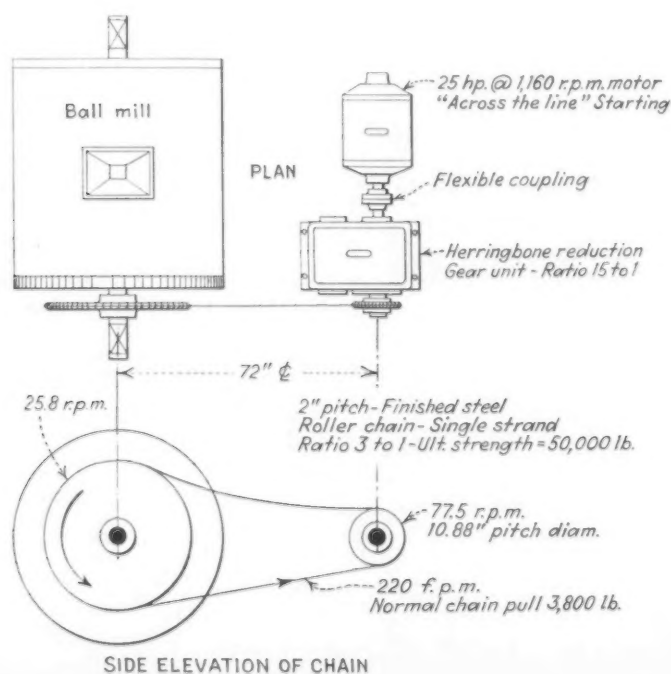
The direct connection of a high-speed motor to a slow-moving load naturally involves high-ratio speed reduction and therefore high torque at the slow speed shaft, because torque increases at a rapid rate with decreasing speeds. In fact, it varies inversely with the speed of rotation, considering the power constant and neglecting friction. In view of this, the problem of power estimation for slow-moving machinery frequently re-

solves itself into one of calculating the torque at the shaft of the driven machine; and then working back to the motor, making suitable allowances for unavoidable losses.

Regardless of the fact, however, that all modern mechanical power transmission applications inherently possess starting-torque, there are installations where the problem is not acute, based on the possibility of overcoming the difficulty by hand-operated devices. This possibility is apparent in both the group shafting and belting and the group shafting and chain methods, since in the former, power is delivered to the driven equipment by a belt controlled by tight and loose pulleys, while in the latter, power is delivered by a chain controlled through the medium of a friction clutch. Regardless of whether the motor is connected to the group line-shaft by belt, chain, or reduction gear unit, such a shaft can be brought to its required speed, to be followed by the gradual application of equipment load, through the medium of either a hand-controlled shifting belt or a hand-controlled clutch. This involves starting torque, but it is not comparable to applying high-speed power instantaneously to a machine at rest.

A Serious Problem

The real problem of high starting-torque is seriously apparent in modern direct power connection, where the actual horsepower requirements and velocity ratios are either normal or high. Particularly because from a first cost economy standpoint it is more advantageous to employ a standard squirrel-cage induction motor with what is termed "across the line" starting than to employ a "slip ring" motor whose inherent quality is gradual acceleration under load. "Across the line" starting brings a motor to full speed in a few seconds; there-



A typical case of "ball mill" transmission, illustrating the problem of high starting torque.

The Problem of High Starting Torque



fore, when a motor started in this manner is applied to a machine either direct or through reduction gearing, it is obvious that an abnormal torque is created which frequently results in machinery destruction. Pertinent to this mechanical difficulty and a demand for "across the line" starting, both electrical and mechanical devices have been designed and are available, which are capable of gradually accelerating the dead load of a machine to its required speed, while the motor is operating at full speed. Such devices not only function in this manner but they also act as a load cushion to the motor. Accessories of this character create a certain first cost expense, but such an item is generally much less than the difference in cost between a "slip ring" motor and the standard squirrel-cage type. The usual practice is to place such high starting-torque devices either between the motor and reduction gear unit or between the motor and the driven machine.

"Across the Line" Starting

In the direct driving of "ball mills" and similar high starting-torque machinery where constant speed is desired, "across the line" starting creates a serious load acceleration hazard unless a device of the above-mentioned character is employed. The following actual case emphasizes this fact:

An individually driven "ball mill" is illustrated by Fig. 1. The motor is 25 hp., standard squirrel-cage type equipped with "across the line" starting control connected through a flexible coupling to a 15 to 1 ratio double reduction herringbone gear unit. The reduction gear is connected to the "ball mill" by a 2-in. pitch single finished steel roller chain at a ratio of 3 to 1 on 72-in. centers. The pull of the chain is on the bottom when

operating, therefore the top side is slack. At a speed of 220 f.p.m. the normal 25-hp. load tension on the chain is 3800 lb., which gives a factor of safety of 13.2 on the basis of 50,000 lb., the ultimate strength of a chain of this size and character. A factor of this proportion is conservative for normal operation, but in this case the effect of "across the line" starting was not taken into consideration.

In all chain drives there must be a certain amount of looseness; therefore, regardless of tightness on the pulling side during operation there is a uniform slackness of the entire chain when at rest. Such a condition produces a time element between the relative rotation of the driving and driven sprockets of the drive, or the ball mill shaft, in this case, lags in relation to the slow-speed shaft of the reduction gear. This is caused by the time required for the chain to become taut on its pulling side. This factor would be of no consequence if high starting-torque was not involved. It would also be rendered harmless by the use of a "slip ring" motor or by the installation of some mechanical or electrical device for gradually taking up this chain slack interposed between the motor and reduction gear.

With "across the line" starting and no take-up device used as a connecting medium from the motor, the slack of the chain must be taken up almost instantly. This causes a snap or sudden jerk on the loose side of the chain equal to a large proportion of the full foot-pound energy of the motor. Such energy is usually high. Therefore, it is apparent that a chain of 50,000 lb. ultimate tensile strength cannot be loaded much beyond this figure without rupture.

In the case illustrated, four chains were broken in 48 hours. Something

had to be done immediately, accordingly as a temporary expedient, a spring idler was installed on the top or slack side of the drive for the purpose of keeping the chain taut in its entirety. This enabled the driven sprocket to start synchronously with the driving sprocket. No further trouble was experienced with chain breakage with this idler installation, yet it was definitely apparent that the life of the entire transmission equipment would be short unless a device for overcoming the starting torque of the mill was installed between the motor and the reduction gear. A "slip ring" motor was considered, but it was found to be more expensive than the average electrical and mechanical high starting-torque devices available.

This installation is an example of what may be expected, regardless of the method of driving employed, when high starting-torque is combined with almost instantaneous full motor speed; if there is no method provided for gradually bringing the speed of load to the speed of the motor. A load of great resistance cannot be brought to its required speed almost instantly without premature destruction of the machinery involved.

Electrical and Mechanical Advantages

The advantages possible through the use of a starting clutch or coupling interposed between the motor and a load of high starting-torque are electrical and mechanical, both of which have direct effects on the ultimate cost and satisfactory operation of the equipment connected by such a clutch or coupling.

Advantages of both electrical and mechanical devices:

- 1—The elimination of costly starting equipment.

(Continued on Page 72)

Metallurgists Debate Merits of A

By T. W. LIPPERT

THE "four horsemen" of the Washington chapter of the American Society for Metals returned to that chapter on May 9 to espouse the relative merits of various elements as alloying agents in steel. They enlivened the meeting as they had many times in the past, before Dr. Gillett and Mr. French left the Bureau of Standards for the Battelle Memorial Institute and International Nickel Co., respectively, and Messrs. Strauss and McKinney forsook the Naval Gun Factory for positions with the Vanadium Corp'n. of America and the Bethlehem Steel Co., respectively.

After correlating the data presented in the addresses, Mr. McKinney in his review showed that certain alloy steels had been repudiated by some users because of serious deviations from laboratory characteristics. This fault, however, is seldom attributable to the alloy manufacturers but usually arises from indifferent cooperation of foundrymen and designers.

Alloy steel technology was shown to have given a great impetus to general manufacturing improvements. Not only have melting, pouring, rolling and treating procedures been carefully revamped, but a more intelligent attitude has been formed regarding product applications and dependable monetary gains. It was stressed that all the skill of the steelmaker must be used not only in

conjunction with future alloy developments but also to take full advantage of experimental discoveries already widely known.

Despite the publicized characteristics of most alloys, steel makers are not ignoring many possible improvements in plain carbon steel. There is a distinct danger of becoming too alloy-conscious, although there is now in evidence a tendency to further develop Si-Mn steels to supplant more expensive complex alloys.

The discussion often returned to Mr. McKinney's suggestion of the need for buyer education regarding the great variations in physical characteristics of alloys. These variations depend to a large extent on the part tested and under what conditions. Needless to say the physicals in a small section are not the same as in a large one, nor are data from test bars dependable for judging conditions throughout a casting or forging. Test bars are dependable only in comparing one heat with another.

Mr. McKinney dealt also with the fallacy of using comparative physical tests on castings and forgings to measure the relative merits of products produced by the two forming operations. As the tested metal may be taken from entirely different sections of radically different designed objects, the relation of the physicals can be made to vary almost at will.

At present Lieut. Linkè, of the Naval Gun Factory, is preparing a treatise on the variation between data taken on test bars and heavy castings and this information will be published in the fall under the auspices of the American Foundrymen's Association. There is also a great need for a similar series of tests on heavy forgings.

The discussion stressed the need of a proper choice of an alloy steel for a particular problem. As fabricating processes are intimately associated with the ultimate product they must receive prime consideration. Quite often the limiting factors of fabrication or specific uses of the product will narrow the choice to several steels, but sometimes a choice of many complex compositions must be made for other reasons.

Although the three speakers supposedly "debated" the relative merits of molybdenum, nickel and vanadium, they sought primarily to bring out just where each metal, either by itself or in combination with others, gives the best results for the least money. In the following outlines of the more important effects of the three elements on steel, it will be noted that each are similar in many ways. Variations in potency, however, were noted. For instance, Mo by itself is not as strong a ferrite strengthener as Ni, nor does it raise the yield strength of normalized steel as markedly as V does. Mo is mainly used in conjunction with Ni, Mn, Cr, Cu and V, or combinations of them, in order to enhance their effectiveness. That is, it accentuates the effect of other elements and often allows a reduction of their amount.

Effects of Vanadium

In discussing vanadium as an alloying element in steel, Mr. Strauss summarized a large amount of experimental data in order to present the more important phases of the problem.

When V is present in a steel bath it is in solution in both the ferrite and carbide, and in the presence of carbon its affinity is so great that much the larger portion is associated

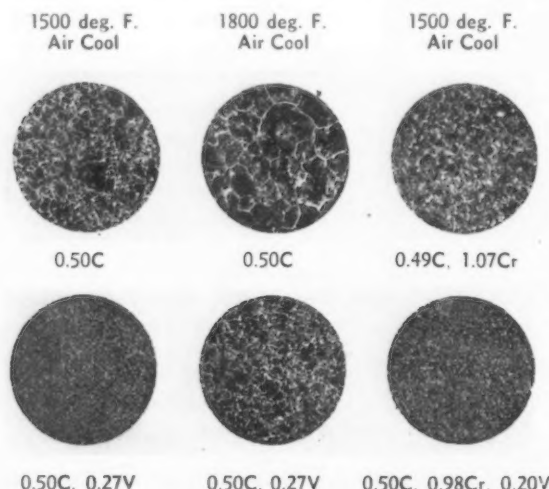


FIG. 1—Effect of vanadium on the grain size of steels. Unlike nickel, vanadium acts on both the cementite and ferrite grains, and apparently acts during the freezing phase thereby being particularly beneficial in castings.

Alloying Elements

Molybdenum by H. W. Gillett

Nickel by H. J. French

Vanadium by Jerome Strauss

Alloys in General by P. E. McKinney

with the carbon. On the basis of considerable circumstantial evidence it appears that V in steel forms compounds other than carbides, possibly with oxygen and nitrogen in a highly dispersed state. There is reason to believe that these compounds and the carbides are responsible for the well-known grain refining influence.

The effects of this fine grain size are noted in the large increases in yield strengths and impact resistances of both carbon-vanadium and complex alloy steels containing vanadium. The magnitude of this grain size effect is fully illustrated in Fig. 1.

Except for castings, there is not much vanadium binary steel made, but V is commonly used in small doses to make ternary and quaternary alloy steels stronger and harder. The crystal structures in castings are also made finer as it cuts down Widmanstätten structure. In addition, it somewhat resembles cobalt in its stiffening action on the space lattice, thereby materially decreasing segre-

gation of cementite. Data regarding the tension and impact values of cast vanadium alloy steels are shown in Fig. 2.

Many producers have recently found V useful in alloy steels in which the banding must be minimized in order to obtain satisfactory general physical properties, and, in particular, to improve the ductility in the transverse direction in forgings having large sections.

The influence of vanadium carbide in steels is observed in generally improved strength values at moderately elevated temperatures, and in a resistance to strength loss on tempering hardened steels.

While vanadium in small amounts is productive of only moderately deep hardening, the hardness is generally very uniform. Therefore, in steels requiring both toughness and deep hardening, this effect can be balanced by a judicious use of other alloying elements. For example, this has given rise to Si-Mo-V steels for battering

tools, and Ni-Cr-Mo-V and Mn-Cr-Mo-V steels for forging dies. Among the newer applications there could be mentioned the high-vanadium high-speed tool steels, Mn-Cr-V automobile steels for both normalized, and quenched and tempered parts, and a number of applications for Mn-V steels of a wide composition range. Among the properties of these latter steels having special interest there could be enumerated the ability in some composition ranges to produce tough and ductile welded structures without heat treatment subsequent to welding, good impact strength at sub-zero temperatures, and an endurance limit in both low and medium-carbon and low and high-alloy types that is consistently well above the usually recognized mean value of 50 per cent of the tensile strength. In connection with this latter feature, it is noteworthy that this influence applies in the annealed state where the endurance limit is low in most steels. It also applies in the normalized and tempered, and in the quenched and tempered conditions.

Effects of Nickel

A portion of Mr. French's review of the alloying effect of nickel in steel dealt with its usefulness in structural steel in order to gain strength in-

(Concluded on Page 62)

STEEL	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	REDUCED AREA	IMPACT
1010 (A)	35-40	55-60	27.5	58.0	25.0
1010 (B)	35-40	55-60	27.5	58.0	25.0
1010 (C)	35-40	55-60	27.5	58.0	25.0
1010 (D)	35-40	55-60	27.5	58.0	25.0
1010 (E)	35-40	55-60	27.5	58.0	25.0
1010 (F)	35-40	55-60	27.5	58.0	25.0
1010 (G)	35-40	55-60	27.5	58.0	25.0
1010 (H)	35-40	55-60	27.5	58.0	25.0
1010 (I)	35-40	55-60	27.5	58.0	25.0
1010 (J)	35-40	55-60	27.5	58.0	25.0

FIG. 2 — Tension and impact tests on cast alloy steels which have been double normalized and tempered.

(A) Experimental laboratory furnace tests
(B) Storage of various commercial steel bars in the test-plant in small quantities

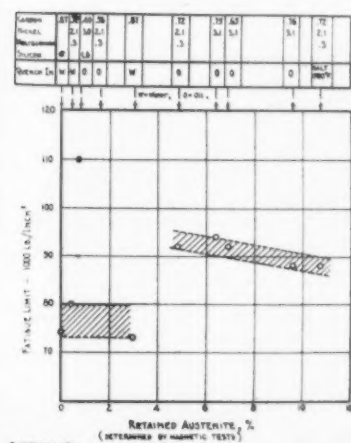
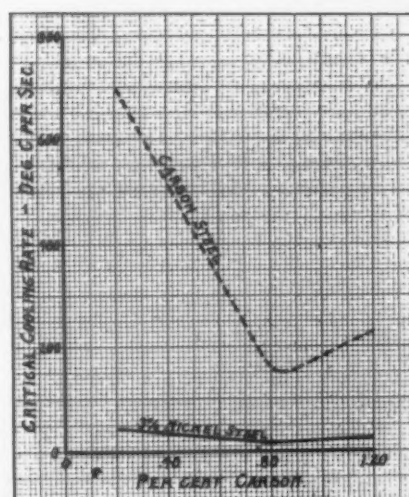
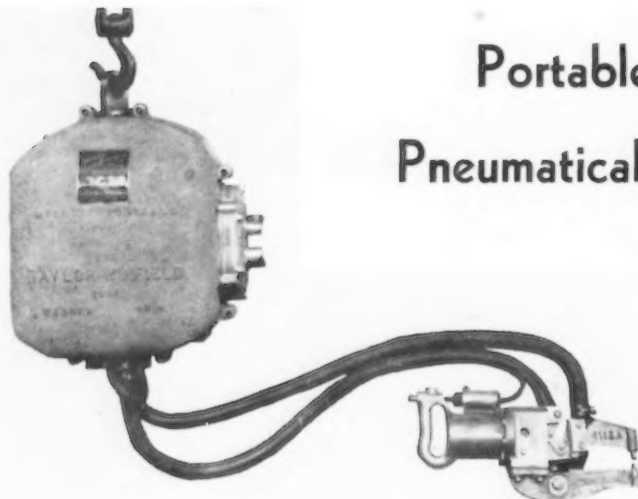


FIG. 4—The effect of small amounts of retained austenite on the fatigue resistance of hardened and high-carbon steels.

FIG. 3—A comparison of the critical cooling rates of carbon and 3 per cent nickel steels. Deeper hardening results as the critical rate is reduced.





Portable Spot Welder Employs Pneumatically-Operated Welding Gun

A nine-step current regulator gives wide range of welding heat control.

A PNEUMATICALLY - OPERATED portable spot welder capable of welding two thicknesses of No. 18 gage, clean stock is being offered by the Taylor-Winfield Corp., Warren, Ohio. The transformer, of 33-kva. capacity, may be suspended from a monorail or mounted

on rollers for floor use. It is housed in an aluminum case, of which an integral part is a nine-step current regulator that permits a wide range of welding heat control.

A pneumatically-operated welding gun is connected to the transformer by means of flexible water-cooled cop-

per leads, as shown, these being of suitable length to permit the operator to work within a convenient radius and in practically any position. The operating thumb button, which is part of the air valve, is depressed approximately $\frac{1}{4}$ in. to admit air to the operating cylinder; further pressure, against a slightly heavier spring, closes the circuit to the welding contactor. With this arrangement, it is impossible for the welding current to come on before the points are together on the work and the proper pressure is built up. As the current is cut off before the points release the work, possibility of burning the work is eliminated. It is stated that many different types of welding guns have been developed for practically every conceivable type of welding job.

Supplies Equipment for Heat Treating 100,000 Razor Blades Daily

FOR hardening and tempering razor blades at the rate of 100,000 per 9-hr. day, H. O. Swoboda, Inc., Pittsburgh, has recently built for a manufacturer in northern New York the continuous electric furnace equipment here illustrated. The equipment consists of a take-off stand; hardening furnace with quench block mounted at outlet end; tempering furnace; power drive for operating strip through the equipment, and a take-up reel.

Furnaces are "Falcon" Type F-1 single tube and are equipped with attachments, shown at the inlet end, for controlling the atmosphere in the furnace chambers. The hardening unit

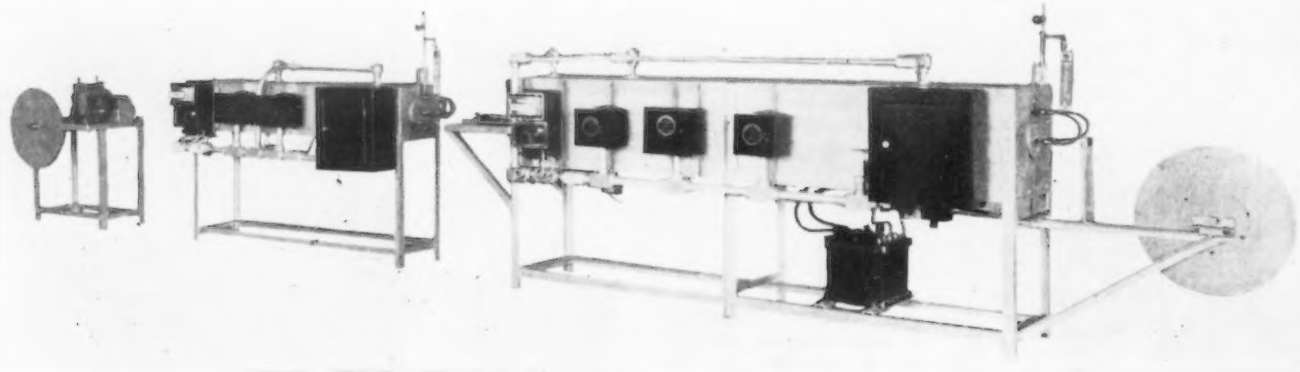
is 9 ft. long and has three-point pyrometer control; the tempering furnace is 6 ft. long and has two-point pyrometer control. Armstrong high-temperature insulating brick incloses the furnace units, the innermost layer being capable of withstanding heat up to 2500 deg. F. The equipment operates on 220-volt, three-phase alternating current.

The annealed strip steel for making the blades is mounted on the take-off reel shown at the right in the illustration, from which it is drawn through the hardening furnace where it is heated to the required temperature (any temperature up to 2000 deg. F.). Emerging from the hardening

furnace it is immediately chilled in the quench block mounted at the outlet end of the furnace. The hardened strip then passes through the tempering furnace, where it is again heated to toughen it to exactly the right amount to prevent the finished blade from breaking when placed in a holder.

A small motor drive unit, shown at the extreme left of the illustration, drives the rolls and reel. The strip is carried through the process at a speed of 27 ft. per min. and is wound on the receiving reel, ready for further processing.

The National Society for the Prevention of Blindness, New York, has revised its leaflet, "Eye Protection in Industry," incorporating suggestions which have been made by industrial physicians, ophthalmologists, safety engineers and industrial executives.



Razor blade strip is drawn from the reel through the hardening furnace, quench block and tempering unit and then wound on the receiving reel, ready for further processing.

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New Abrasive-Belt Grinders Handle Sheets Up to 48 In. Wide

FACTORY-COATED abrasive belts are employed on the new machine developed recently by the Mattison Machine Works, Rockford, Ill., for grinding alloy steel, carbon steel and other sheets. Ample weight and rigidity assure freedom from chatter and vibration, and it is stated that precision construction makes possible taking advantage of improved abrasives on sheet grinding operations.

Two models are available, one with roll feed and one with a reciprocating table. The roll-feed machine is designed for superficial and rough grinding, where one pass under the abrasive is sufficient to clean the surface to the desired extent. This model also lends itself to tandem operation, in which a number of units may be set in line and the stock passed from one to the next progressively.

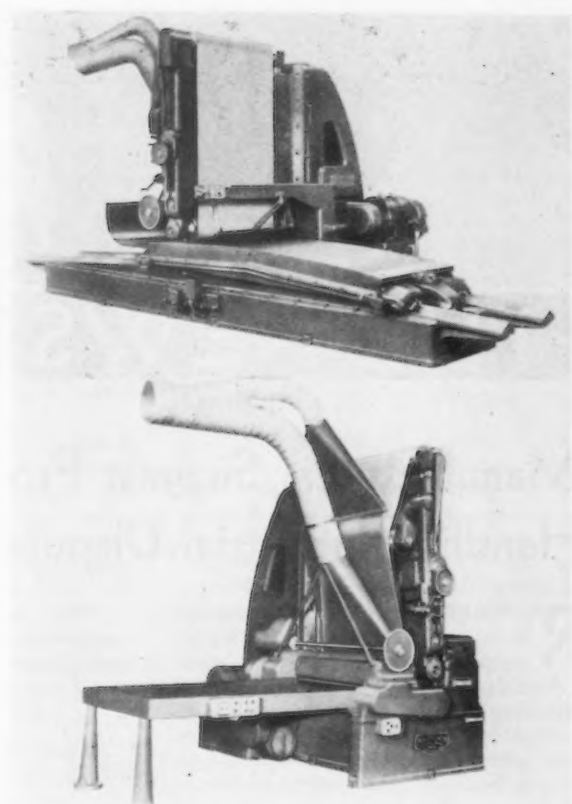
The model with reciprocating table is intended for the finer finishing operations where more than one pass is required. Thin sheets resting on the curved surface of the table are flexed so that buckles are evened out and a flat cross-section is always presented to the grinding belt. It is

▲ ▲ ▲
The reciprocating-table sheet grinder shown at upper right is for finer finishing operations and the roll-feed machine, pictured below it, is for roughing.

pointed out that since the sheet is flexed in the direction opposite to the curve of the grinding roll, penetration of the abrasive grain into the surface of the metal is improved, and better cutting action results. Because of the short contact at the cutting point, the cut of each grain is shortened, breaking up the cuts and preventing long scratches in the work.

The main arm that carries the abrasive grinding belt, driving and idler rolls, is vertically adjustable as a unit

on the heavy column for different thicknesses of material and for setting to the cut. Belts may be changed quickly, as it is only necessary to lower the top tensioning idler, remove the belt and slip on another and run up the tension roll. The outer side is open so that no bearings or any other parts have to be removed in this operation. Standard sizes of these machines carry belts up to 50 in. wide. Both models will grind sheets up to 48 in. wide.



Wide Range Boring Bar Has Micrometer Adjustment

WIDE range and close micrometer adjustment are features of the heavy-duty boring bar here pictured, manufactured and patented by Roy V. Russell, 1207 Calumet Avenue, Middletown, Ohio. With the three interchangeable boring bars provided, the tool may be used for holes ranging from 9/16 to 12 in. or more in diameter.

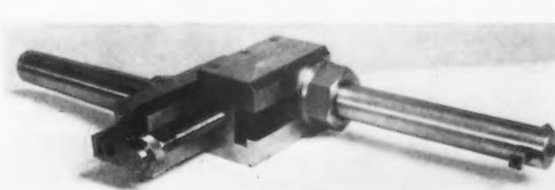
The boring bars slide and clamp in the T-slot of the main head. They are 1/2, 3/4 and 1 1/4 in. in diameter and will

bore through 4, 5 1/2 and 7-in. lengths respectively. Taper shanks, which may be Nos. 9, 10 and 12 Brown & Sharpe, or Nos. 4, 5 and 6 Morse, are also interchangeable. The tool may be adjusted quickly, and locked positively when boring.

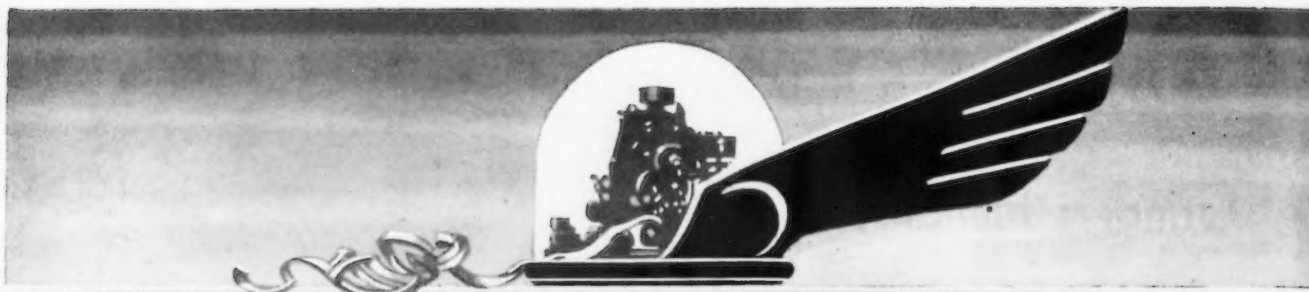
The 1 1/4-in. diameter tool illustrated may be used to bore a 12-in. hole with only 7/8 in. of the tool bit extending beyond the boring bar. In boring a blanking die on a milling machine, considerable time is saved in

completing the guide pin holes in one set-up. Close proximity of the bar to the work is emphasized as reducing breakage and saving tool bits, and the micrometer adjustment eliminates guess-work in setting the tool. It is stated that by using a special boring bar with tool inserted lengthwise and fastening the bar lengthwise, so that the centerline of the bar is at right angles but under the centerline of the bore, any reasonable diameter of hole beyond 12 in. may be bored without sacrificing the advantage of the micrometer adjustment.

With the three interchangeable boring bars, the tool may be used for holes from 9/16 to 12 in. or more in diameter.



The Moltrup Steel Products Co., Beaver Falls, Pa., has removed its New York sales office to the Canadian Pacific Building, 342 Madison Avenue. J. J. Callahan is district manager.



THE NEWS OF THE WEEK

Manufacturers Suggest Program For Handling Industrial Disputes

REPRESENTING a concerted effort on the part of industry to meet and solve the nation's labor difficulties, a constructive program for handling industrial disputes with fairness alike to employers and workers has been made public by the directors of the National Association of Manufacturers. The proposal was drafted after weeks of study by a special committee under the chairmanship of George H. McNeir, chairman, Mohawk Carpet Mills, Amsterdam, N. Y. It follows in many respects the broad-vised plan created by President Roosevelt in settling the threatened automobile strike, and places industry behind a vehicle for speedy settlement of disputes instead of letting them drag out.

In making the program public with its approval, the board said:

"It has the widespread support of industrialists and should have the support of those who speak on behalf of workers, for it equitably recognizes their right to proportionate representation in every dispute. It embodies the American tradition of justice and fairness to all citizens. The plan is a whole-hearted response on the part of industry to the President's stated purpose of industrial self-government and cooperation.

"It emphasizes the primary importance of plant relations and plant adjustment of complaints and grievances, it keeps the dispute where it belongs, within the industry throughout appellate consideration, save in a case of national importance, when the President might name a third man for an arbitration committee. It makes appropriate provision for the determination of questions of law or interpretations of section 7a of the recovery act by the responsible administrative authority."

The board said machinery for handling labor difficulties "should be executive and not legislative in origin and direction.

"This alone insures flexibility as against rigidity so that improvement may be made in the light of experience."

Committee Personnel

In addition to Mr. McNeir, the committee which drafted the plan was composed of E. C. Heidrich, Jr., president, Peoria Cordage Co., Peoria, Ill.; Grant Simmons, president, Simmons Co., New York; William R. Webster, chairman, Bridgeport Brass Co., Bridgeport, Conn., and Charles R. Hook, president, American Rolling Mill Co., Middletown, Ohio.

The program emphasizes first the need of settling disputes where they originate in the plant to avoid the wasteful strikes which have interfered so much with the recovery program while centralized authorities sought to act upon myriad controversies all over the country.

Second, it provides for appellate bodies within each industry, composed of equal representatives of employees and employers, with the workers' representation based upon the membership of each organization claiming to speak for employees in the industry. Over this board would preside an impartial chairman selected by both parties.

Third, if the matter assumed proportions of national interest, which would be less likely with such machinery, the third arbitrator could be given the weight of appointment by the President or the recovery administrator.

Disputes over questions of law or interpretation of section 7a of the recovery act would be referred to the national administrator and his general counsel for determining the rule for application.

The board's statement follows:

Plan Outlined

The setting up of industrial relations committees within each industry presents the entry-way to a self-organized and

self-administered plan of securing the orderly adjustment of labor disputes without interruption of service in each plant and industry, which, with appropriate appellate bodies, may practically dispose of the most serious and extensive disputes. Not only is this theoretically possible but the experience already had with specific codes demonstrates its practicality.

The spirit of the recovery legislation urges that the obligation should rest upon employer and employee to provide methods of adjustment, to promptly dispose of disputes initially in the plant where they arise and, on appeal, to an appropriate body within the industry, with each of the parties properly represented. Every emphasis should be placed on initial adjustment by the parties, with resort to appellate action within the industry only where a serious question of principle or policy is presented.

In conformity with the theory of securing self-governing industries capable of performing all the functions of self-control and self-adjustment, the machinery should be executive and not legislative in origin and direction. This alone insures flexibility as against rigidity so that improvement may be made in the light of experience.

It should be temporary and not permanent. That is, its life should be the life of the code. If permanent machinery proves desirable, it will be demonstrated by the experience thus obtained.

It should be established and operated within the respective coded industries, thus bringing to bear the special experience of the parties familiar with the conditions and circumstances of particular plant and industrial operations.

On the failure of steadily encouraged plant adjustment, appeal would be had to a standing appellate body within the industry, composed, like the original adjustment body, of equal representatives of employer and employee but with an impartial chairman selected by the parties. This body may be regional, if the distribution of the industry requires, or localized in accordance with its situation.

This keeps the appellate action and issues within the industry where they belong and builds up rules of interpretation and conduct in a serious matter which the parties were unable to compose.

Arbitration Provided

Arbitration may be provided by the appointment of two representatives, one for each of the parties, the third to be appointed by the recovery administrator. If the matter assumed proportions of na-

tional interest, the third arbitrator could be given the dignity of appointment by the President, as in the automobile controversy.

Disputed questions of law or interpretation of section 7 of the NIRA would be referred to the national administrator and his general counsel for determining the rule for application.

Adjustment of labor disputes is a challenge to the rational capacity for self-government on the part of employer and employee within their respective industries. All grievances and complaints can and should be settled in the plant where they originate by direct negotiation between management and men or their representatives. Anything that treats this basic contact lightly by easily removing the settlement of disputes from the place of daily relation to external and remote bodies defeats the purpose of self-government by employer and employee. If the place of adjustment and its personnel are remote from the origin of the dispute, the worse for both parties, the greater the delays and the more expensive the process.

In the plan suggested for operation within each industry the parties may agree to an impartial arbitrator whenever a dispute remains unsettled in the plant. If the dispute becomes of serious or national proportions a third arbitrator may be appointed by the recovery administrator or the President, as in the automobile dispute. But usually appeals will be disposed of by the continuing appellate body within industry, while questions of interpretation arising from the application of section 7 are determined when needed by the national administrator and his counsel, otherwise by the standing interpretation.

Such a plan maintains a sense of proportion in the disposition of disputes. It emphasizes the primary importance of plant relations and plant adjustment of complaints and grievances. It keeps the dispute where it belongs, within the industry throughout appellate consideration, save in a case of national importance. It makes appropriate provision for the determination of questions of law or interpretation by the responsible national administrative authority. It is likely to meet with general industrial acceptance. It should be equally acceptable to employees as it equitably recognizes their proportionate right to representation in every dispute.

It embodies the American tradition of justice and fairness to all citizens. The plan is a wholehearted response on the part of industry to the President's stated purpose of industrial self-government.

Follansbee Brothers Co. in Receivership

THE Follansbee Brothers Co., Pittsburgh, on petition of William J. Kirk of California and the Aetna-Standard Engineering Co., Youngstown, in behalf of themselves and other creditors, has been placed in receivership. John Follansbee, president of the company, and George T. Ladd, president, United Engineering & Foundry Co., are the receivers appointed last week by the United States District Court.

British Furnaces Sold Through Third Quarter—98 Stacks Active

LONDON, ENGLAND, May 14 (By Cable).—Pig iron is sold well ahead, and output is being readily absorbed, although 98 furnaces are now operating in the United Kingdom. New forward business in Cleveland pig iron is rather quiet, but renewal contracts are expected shortly. Hematite demand is strong and makers are sold over the third quarter with willing buyers up to December.

Increased steel production is being easily sold despite higher imports of foreign semi-finished. Billets and bars are very active, and increasing specifications of rolled steel for home and export are reported. Shipments are being made to Argentina and Russia.

The Government is expected to prolong iron and steel import tariffs ending in October for another five years.

Tin plates is in fair demand for home and export consumption. Prices are firm, but only small tonnages are being sold. Welsh, United States and German tin plate producers are understood to have agreed on a policy to be adopted if French and Italian mills join agreement. Negotiations with the French and Italians are proceeding satisfactorily. Continental iron and steel markets are very in-

active. Sheet demand is better, and Japan has placed fair orders for light sheets. Demand for plates is disappointing, but bars are in request. There is labor unrest in Belgium, and strikes are rumored.

British Iron and Steel Output Off in April

LONDON, ENGLAND, May 15 (By Cable).—Production of steel ingots in Great Britain during April amounted to 716,800 tons, compared with 829,700 tons in March and with 509,600 tons in April, 1933. Although April had two less working days than March, there was a slight decline in the daily rate.

Pig iron output at 496,300 tons was also slightly lower than the March total of 503,600 tons, although considering the one less working day the daily rate was higher. Pig iron production in April, 1933, was only 324,700 tons.

Monthly totals for 1933 and the first four months of 1934 are shown in the following table:

1933	Pig Iron	Steel Ingots
Jan.	286,600	444,400
Feb.	270,800	482,700
March ...	332,200	577,700
April	324,700	509,600
May	339,900	599,600
June	345,600	568,800
July	343,900	567,500
Aug.	362,700	551,300
Sept.	359,700	669,000
Oct.	373,300	668,300
Nov.	374,900	695,000
Dec.	409,300	668,900
	4,123,600	7,002,800
1934		
Jan.	441,300	711,000
Feb.	414,400	707,500
March ...	503,600	829,700
April ..	496,300	716,800

Machinery and Tools Institute Elects

THE annual meeting of the American Machinery and Tools Institute was held in Chicago, April 26, and the following officers and directors were elected:

President, E. G. Todt, E. G. Todt Co., Chicago; vice-president, Rudolph Krasberg of R. Krasberg & Sons Mfg. Co., Chicago; treasurer, Craig B. Hazelwood, First National Bank, Chicago; secretary, George R. Tuthill, 40 North Wells Street, Chicago; directors, E. R. Prout, Teletype Corp., Chicago; J. S. Kozacka, Lewis Institute, Chicago; F. B. Coyle, International Nickel Co., Inc., New York; A. C. Wais, The Niles Tool Works Co., Chicago; J. Gordon Barr, Morse Twist & Machine Co., Chicago.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton			
Ferromanganese, export	£9		
Billets, open-hrth. £5 10s.		to £5 15s.	
Tin plate, per base box	17s.	3d. to	17s. 9d.
Steel bars, open-hearth	£7 17½s.		
Beams, open-hrth. £7 7½s.			
Channels, open-hearth	£7 12½s.		
Angles, open-hearth	£7 7½s.		
Black sheets, No. 24 gage	£9 5s.		
Galvanized sheets, No. 24 gage	£11 5s.		

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £			
Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.			
Billets, Thomas ...	£2 7s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
Steel bars, merchant	£3 5s.		
Sheet bars	£2 8s.		
Plates, ¼ in. and up	£4		
Plates, 3/16 in. and 5 mm.	£4 2s.	6d.	
Sheets, ¼ in.	£4 7s.	6d.	
Beams, Thomas ...	£3 1s.	6d.	
Angles (Basic) ...	£3 2s.	6d.	
Hoops and strip base	£4 2s.	6d.	
Wire, plain, No. 8	£5 7s.	6d.	
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G. ...	£8 15s.		

W. E. Sykes Receives Edward Longstreth Medal

UPON the unanimous recommendation of its committee on science and the arts, the Franklin Institute, Philadelphia, has awarded William E. Sykes, Farrel-Birmingham Co., Inc., Buffalo, N. Y., the Edward Longstreth Medal "in consideration of the design and development of the Sykes gear generators."

Mr. Sykes was born in 1883. In 1911, while chief engineer and factory manager of the Power Plant Co., Ltd., West Drayton, Middlesex, England, he developed the first gear generator that bears his name and for which he is now being honored. Coming to the United States in 1922, he joined the Farrel-Birmingham Co. and since, at its Buffalo plant, has supervised the building of gear generators and the manufacture of Farrel-Sykes speed reducers, gears, mill drives and airplane engine dynamometers.

The Sykes machine was developed originally for cutting continuous-tooth herringbone, or double-helical, gears. Later it was applied to double helicals with a center groove, teeth matched or



WILLIAM E. SYKES

staggered and with helices of similar or dissimilar pitch, and later still, to the production of spur, single helical, and internal gears. The generators have been built in capacities up to 22 ft. in diameter, 60-in. face width, 6 CP or 1/2 DP for cutting gears and pinions for rolling mill drives. Mr. Sykes has also developed a gear tooth comparator and other gear inspection instruments.

Code Authority for Spray Painting Group

AT a meeting of the spray painting and finishing equipment manufacturing industry held at Cleveland on May 1, the following six members were elected to the code authority for administering the recently approved spray painting and finishing equipment manufacturing code: W. F. Gradolph, DeVilbiss Co., Toledo, Ohio; H. W. Beach, Eclipse Airbrush Co., Inc., Newark, N. J.; W. B. Thompson, Sprayco, Inc., Somerville, Mass.; J. F. Roche, Binks Mfg. Co., Chicago; J. A. Paasche, Paasche Airbrush Co., Chicago, and S. Deutsch, Electric Sprayit Co., South Bend, Ind.

Manganese Ore Code Approved

WASHINGTON, May 15.—General Johnson has approved code for the manganese ore industry, sponsored by the American Manganese Producers' Association. By coincidence it was approved on the same day that Senator Wheeler of Montana, J. W. Furness, chief of the minerals division, Department of Commerce and two manganese ore producers, H. A. Pumpelly and J. H. Cole, Butte, Mont., called on President Roosevelt. Sena-

tor Wheeler would not discuss the purpose of the visit other than to say aid was being sought for the domestic manganese ore industry and that the subject would be taken up with the War Department. Reference to the latter plan gave rise to the report that the War Department might be asked to lay in reserves of domestic manganese ore.

Scrap Industry Urges Price Stabilization

The urgent need for stabilized scrap prices during a limited period, to eliminate speculative fluctuations, was discussed at a meeting of the New Jersey chapter of the Institute of Scrap Iron and Steel held at the Hotel Plaza, Jersey City, on May 8. Harry Harris, Ohio Metal Supply Co., Chicago, delivered an address in which he pointed out that with steel production increasing and scrap prices declining, serious question has arisen as to the value of any code for the scrap iron industry, which imposes increased costs of operations, without any compensating influences.

A motion was adopted by the chapter requesting the executive committee to hold a special meeting within the next few days, to discuss recommendations that should be included in a supplementary code of fair competi-

tion. M. V. Bonomo, representative of the New Jersey chapter on the National Code Authority, will attend this meeting, so that the executive committee can advise him concerning conditions in New Jersey.

The consensus of opinion of the members was in favor of closing scrap iron yards on Saturday. A questionnaire, however, was authorized to be sent out to the scrap iron dealers of New Jersey to ascertain their wishes in the matter before any recommendations be made to the National Code Authority.

Building Contracts Lower in April

CONTRACTS let during April for all classes of construction showed a decline of about 26 per cent from the March volume, according to F. W. Dodge Corp. The current total, however, was more than twice as large as the total shown for April, 1933. The April contract volume for the 37 Eastern states amounted to \$131,413,800 as against \$178,345,800 for March and only \$56,573,000 for April of last year.

For the elapsed months of 1934, construction awards totaled \$592,939,600 as against \$252,599,800 for the corresponding four months of 1933. Gains over 1933 were shown in the totals for 1934 to date in each of the four major construction classes.

Government Pay Exceeds Manufacturing Income

FEDERAL, State, and local governments disbursed in 1932 in the form of salaries, wages, and interest \$6.8 billion, or about \$900 million more than the total income of \$5.9 billion produced by all the manufacturing industry of the country, according to an analysis of official figures of the changes in the production and distribution of the national income since 1929, issued by the National Industrial Conference Board.

Government disbursements in 1932 were \$340 million larger than in 1929, while income produced by manufacturing in 1932 was \$13.5 billion less than in 1929.

The actual payments by government to labor and capital employed by it represent income produced by government. Income originating in the field of government activity is thus made up of the payments to employees plus interest on governmental debt. Payments to employees increased from \$4,984 million in 1929 to \$5,277 million in 1932, and during the same period interest payments on public debt rose from \$1,472 million to \$1,520 million.

Shipments of Steel Corpn. Show 9 Per Cent Increase During April

APRIL shipments of steel products by the United States Steel Corpn. amounted to 643,009 tons, as compared with 588,209 tons in March, a gain of 9.3 per cent. In April, 1933, shipments totaled 335,321 tons, while in 1932 the corre-

sponding figure was 395,091 tons.

April shipments were at the rate of 41.5 of the corporation's productive capacity for rolled and finished steel products, compared with 36.6 in the previous month and 21.6 per cent in April, 1933.

MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORPN.

Month	1930	1931	1932	1933		1934	
				Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity
January	1,104,168	800,031	426,271	285,138	17.7	331,777	19.8
February	1,141,912	762,522	413,001	275,929	18.5	385,500	26.3
March	1,240,171	907,251	388,579	256,793	15.3	588,209	36.6
April	1,188,456	878,558	395,091	335,321	21.6	643,009	41.5
May	1,203,916	764,178	338,202	455,302	27.1	.....	.....
June	984,739	653,104	324,746	603,937	37.4	.....	.....
July	946,745	593,900	272,448	701,322	45.1	.....	.....
August	947,402	573,372	291,688	668,155	39.8	.....	.....
September	867,282	486,928	316,019	575,161	35.6	.....	.....
October	784,648	476,032	310,007	572,897	35.5	.....	.....
November	676,016	435,697	275,594	430,358	26.7	.....	.....
December	579,098	351,211	227,576	600,639	28.7	.....	.....
Plus yearly adjust-ment	(40,259)	(6,040)	(5,160)	(41,283)	...	.....	.....
Total for year	11,624,294	7,676,744	3,974,062	5,895,235	30.1	.....	.....

Materials and Testing Meeting In June at Atlantic City

THE annual meeting of the American Society for Testing Materials is scheduled for the week of June 25 at the Chalfonte-Haddon Hall, Atlantic City, N. J. Technical contributions in the metals fields will cover creep tests and properties, effects of sizes of test specimens, corrosion of steel under water, protection of pipe lines from corrosion and impact strength of die castings. Papers are scheduled also on a high-speed fatigue testing machine, effect of notches and laws of similitude in testing and the Huggenberger tensometer. The committee on light metals and alloys will present data on their physical and corrosion-resistant properties, and the committee on corrosion of non-ferrous metals will report on exposure tests.

The following nominations for officers are announced:

For president: W. H. Bassett, metallurgical manager, American Brass Co., Waterbury, Conn.

For vice-president: H. S. Vassar, laboratory engineer, Public Service Electric & Gas Co., Irvington, N. J.

For members of executive committee: H. A. Anderson, metallurgical engineer, Western Electric Co., Chicago; H. J. Ball, professor of textile engineering, Lowell Textile Institute, Lowell, Mass.; W. M. Barr, assistant to executive vice-president, Union Pacific Railroad, Omaha; L. S. Marsh, manager, department of inspection and metallurgy, Inland Steel Co.,

Chicago, and J. B. Rather, in charge general laboratories, Socony-Vacuum Corpn., New York.

The Charles B. Dudley Medal for 1934 will be awarded to R. L. Templin, chief engineer of tests, Aluminum Co. of America, for his paper presented in 1933, entitled "The Fatigue Properties of Light Metals and Alloys." The Edgar Marburg lecture will be delivered by Sheppard T. Powell, consulting sanitary and chemical engineer, Baltimore, and his subject is "Water as an Engineering and Industrial Material."

Some of the papers announced are the following:

Rockwell hardness tests on thin sheets, by R. L. Kenyon, American Rolling Mill Co.

Huggenberger tensometer, by R. W. Vose, Massachusetts Institute of Technology.

String method of measuring deformations, by N. Davidenkoff, Phys.-Mech. Institute, covering experiments in U.S.S.R.

Effect of notches and laws of similitude in material testing, by A. Nadai and C. W. MacGregor, Westinghouse Electric & Mfg. Co.

Effect of size and shape of test specimens, by Inge Lyse and C. C. Keyser, Lehigh University.

Blue brittleness in sheets, by R. L. Kenyon and R. S. Burns, American Rolling Mill Co.

Statistical methods for solving metal-

lurgical problems in the steel plant, by W. C. Chancellor, National Tube Co.

Interpretation of creep tests, by P. G. McVetty, Westinghouse Electric & Mfg. Co.

Creep properties of chrome-molybdenum still tubes, by H. C. Cross, Battelle Memorial Institute, and E. R. Johnson, Republic Steel Corpn.

Aging embrittlement of 4 to 6 per cent chromium steel, by H. M. Wilten and E. S. Dixon, Texas Co.

High-speed fatigue testing, by G. N. Krouse, University of Illinois.

Effect of surface finish on initial corrosion of steel under water, by L. J. Waldron and E. C. Groesbeck, Bureau of Standards.

Strain measurements in tests of metals, by R. L. Templin, Aluminum Co. of America.

Impact strength of zinc die castings, by E. A. Anderson and G. L. Werley, New Jersey Zinc Co.

Mining Congress Protests Pending Legislation

Leaders of the metal mining industry of America, meeting last Friday in executive session at Cincinnati, during the annual Mining Congress, entered protests against the securities control bill, the Wagner Bill and the unemployment insurance bill now pending in Congress.

Protests against the securities bill were based upon the claims that it would tend to restrict investment in mining and make it almost impossible to raise capital to exploit properties. The Wagner Bill was objected to because it was charged that it would serve to drive a wedge of prejudice between employers and employees and tend to destroy mutual confidence.

During the opening sessions of the metal and coal mining divisions, closer cooperation to advance matters of mutual interest was urged by Howard I. Young, president of the American Mining Congress. Young advocated a united front toward destructive aspects of the new deal.

A feature of the congress was an exhibition of mining equipment. The session adjourned after a four days' meeting.

PROPERTIES and uses of Trenite, a heat, corrosion and wear-resistant cast alloy, are outlined in a new bulletin issued by the Trenite Corpn., 227 Fulton Street, New York. The alloy is offered for use also where strong, tough, close-grained castings that may be machined with fine finish are required. Two varieties are marketed. One, the type H, resists corrosion and wear, as well as heat up to 1500 deg., is readily machinable and is said to have twice the strength of cast iron. The other, designated as the WX, is for severe abrasion resistant applications; the hardness of this alloy reaches 700 Brinell.



THIS WEEK IN WASHINGTON

NRA Undertakes Simplification

*Service Codes To Be Turned Over To States—
Amending of Steel Code To Affect Basing
Points and Price Waiting Period*

WASHINGTON, May 15. — Dumping of "nuisance" codes has been definitely announced by General Hugh S. Johnson as one of the important changes the NRA is undergoing as it approaches the end of its first year of operation. It is working back toward the original conception of simple codification of industry. The extent to which it may go in this direction is not known. There is doubt that the NRA has mapped out a specific program. Rather the feeling is that policies are being shaped gradually and adjusted to developments.

The general trend, however, is distinctly toward lessening the load of complications and ramifications which have sprung up and woven a tangle around NRA. The throwing off of the small codes greatly relieves it of heavy burdens, burdens which General Johnson said have taken 85 per cent of the time, personnel, money and effort of the organization and yet have covered only 15 per cent of the recovery program.

These nuisance or trade service codes cover a wide range of intrastate activities, such as service garages, dry cleaning, laundries, barber shops, beauty shops, etc. Then there are many other small industrial codes, such as those covering pig nose rings, mopsticks, corn cob pipes, etc., which may also fall by the wayside. The idea is to turn these dropped codes over to the States to be operated under the President's Reemployment Agreement, with the right to display the Blue Eagle. Wages,

By L. W. MOFFETT

Washington Editor, THE IRON AGE

hours, working conditions, section 7-a (collective bargaining) and a few simple trade practices will cover these codes.

To Simplify Codes

There is indeed a movement even within the NRA itself to turn all codes back to these simple principles; to wipe out lengthy trade practices, and to abolish all forms of price provisions. It was just such a conception that underlay the original principles of the National Industrial Recovery Act in the view of many members of Congress, including some of its principal advocates.

With codes stripped to this simple formula, there is a question as to whether industry generally would be interested much, if at all, in codification. There is, however, an offset to this possible lack of interest in the insistence of many favoring simplification that protection against "chiseling" must be afforded. This is not to say there is not a school of thought, said to be existent within the NRA itself, that even this barrier should be removed and free rein given to industry to work out its own problem, a view that goes all the way toward self-government. It is a view that some of the New Dealers sniff at as being an Old Deal idea and the

Old Deal-phobia is still widely prevalent in Washington.

General Johnson frequently indulges himself in lashing the Old Dealers. Yet he is much more of a realist than the brain trusters and others within the Roosevelt administration, who jump on the General's broad shoulders more violently than do the Old Dealers. The General would have difficulty in proving that "enemies" of the NRA are among the Old Dealers only. The sharpest critics are within, such as Darrow's board, the AAA, the Federal Trade Commission and other Government organizations less vocal. Nor does there seem to be much affection between the Department of Justice and NRA.

General Johnson Realistic

Being well streaked with realism perhaps explains why General Johnson is turning more and more toward the idea of self-government by industry. It may be that his move is stimulated by a realization of the fact that NRA has found itself in dangerously deep water in trying to undertake the gigantic and impossible task of policing all industry of the United States. This having been brought home to him after almost a year of taking on burdens that but few men could possibly carry likely accounts for the unloading of nuisance codes, the withdrawing of "crack down" ideas, the declaration that NRA cannot be enforced with penalties and policemen, and the move to have industry take over to a greater degree the job of governing itself. While there are, as

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might be expected of a mercurial temperament, inconsistencies in the General's statements and policies, the drift appears toward greater recognition of natural forces that industry itself must deal with and with better results than can come from a Governmental bureaucracy.

It is not expected, however, that NRA under General Johnson's guidance will go all the way with either those urging virtually widespread lifting of control over industry or those who want it tightened. He has criticized sections of industry for wanting to eat their cake and still have it. He is not in favor of letting industry pick what it wants from NRA and throwing overboard what he considers are the rights of labor, though he wants industry to handle its own labor problems to a greater degree than it now does. At the same time the General will continue to strike out at critics who assail NRA as oppressing small enterprises, promoting monopoly, and other alleged offenses with which it has been charged by Darrow's board and the Federal Trade Commission in particular.

Steel Code a Target

The steel code has been made a vehicle for some of these charges by both the Darrow board and the commission. Its pending amendment will reflect General Johnson's attitude on those subjects. It is clear he does not share the views of the Darrow board and the commission as to the steel code. At the same time he has said he is not satisfied with the code.

While he has said that the steel code will be "slightly amended and extended" beyond May 31, it is now understood that the General has returned to a former view that some important changes should be made in it. The assumption is that one will relate to basing points, and it is a question as to whether the NRA and the steel industry are in agreement on the subject, now under negotiation along with other plans for amendment of the code. However, it is evident the suggestion of the Federal Trade Commission that steel prices be made f.o.b. mill is not even being considered by the NRA. Rather the idea appears to be that basing points will be broadened, along the lines suggested in THE IRON AGE of May 10, page 52. The General has declined to make an announcement on proposed changes pending negotiations under way. Another change, however, which is expected to be made relates to the filing of prices. It is believed that the waiting period provision will be done away with if NRA has its way. This is based on the fact that NRA has adopted the policy of requiring that prices become effective immediately upon filing.

It is evident that price protection will be continued in the steel code.

This view is taken from remarks made last Saturday night by General Counsel Donald Richberg at the annual dinner of the American Law Institute in Washington. Mr. Richberg and Division Administrator K. M. Simpson are Administration members of the steel code authority.

Mr. Richberg, who spoke on "A Plea for Planning," said that price fixing and wage fixing are bad medicine and went on record in favor of both. Likewise he again registered himself in favor of honest collective bargaining. Price fixing, he said, does not conform to a competitive system, and to this end it was likened to bad medicine.

"But a sick man often needs medicine that may help him to get well although it will not keep him well," said Mr. Richberg. "So long as cut-throat competition threatens to be not the life but the death of trade, and serves to promote and not to prevent monopoly, we may need to fix the levels below which there should be no price competition."

Also referring to wage fixing as bad medicine, Mr. Richberg said that it may be necessary to establish minimum wages and maximum hours so

long as "employers will compete for profits by underpaying and overworking men and women."

"Ultimately in accordance with the principles of self-government, determination of wages and hours for the masses of workers must be found in honest collective bargaining," Mr. Richberg continued.

"Voluntary labor organization is just as much a means of preserving freedom as voluntary management organization, and it should not require a Government club to compel intelligent business men to deal with the freely chosen representatives of their employees. But so long as the traditions of the feudal lord and slave driver persist among some employers of labor, it will be necessary for the Government to prevent those abuses of economic power that compel men to give up their constitutional right of self-organization and association for mutual aid and protection. On the other hand whenever labor organization itself attains the economic power inherent in its adequate organization, it must accept and fulfill corresponding responsibilities and legal obligations to the public welfare."

Direct Capital Levy In New Revenue Law

WASHINGTON, May 15.—Estimated to provide an additional annual revenue of \$417,000,000, the new tax law signed last Thursday by President Roosevelt strikes a New Deal note by carrying a direct levy on capital. It provides a one-tenth of 1 per cent tax on the declared value of corporation capital stock and a 5 per cent levy on earnings above 12½ per cent of such capital. This levy is expected to be the largest single source of income under the new act, and is estimated to raise \$95,000,000 annually. Full effects of the law will not be felt until 1935 and it is the opinion of treasury experts that it will raise an additional revenue of only \$167,000,000 when the current fiscal year ends June 30, 1935. After it is in full force the total estimated returns from the act plus levies that already existed will be about \$3,667,000,000.

The new capital gains and loss provision permits deduction from taxable income only to the extent of capital gains, except that \$2000 of any excess loss may be charged off from ordinary income. Designed to close up loopholes by which wealthy citizens and prominent banking interests escaped income taxes, the act for purposes of taxation measures capital gains at 100 per cent, if the asset is held less than one year ago; 80 per cent, if from one to two years; 60 per cent from two to five years; 40

per cent from five to 10 years and 30 per cent if more than 10 years. Partnership allowances for losses are limited to curtail deductions to the extent of gains from the sale of capital assets. Limited charge-offs from exchanges of stocks and reorganizations are provided.

Railroad Repair Loans Reach \$27,319,000

WASHINGTON, May 15.—Loans to railroads by the Public Works Administration for repairing cars and locomotives have totaled \$27,319,000, of which \$15,790,000 was for the purchase of materials and \$11,525,000 for the payment of wages. Report to this effect has been made to Administrator Ickes by Frank C. Wright, director of the PWA's division of transportation loans. The railroads to which these loans were made are the Baltimore & Ohio, Boston & Maine, Delaware, Lackawanna & Western, Great Northern, Illinois Central, Lehigh Valley, Southern Pacific, Chicago, Milwaukee, St. Paul & Pacific and New York, New Haven & Hartford.

Cleveland-Cliffs Iron Co., Cleveland, had net profit of \$105,274 in 1933, compared with a deficit of \$2,532,727 during the previous year.

SKF Industries, Inc., has consolidated its executive sales, engineering, research and production departments at its Philadelphia plant.

Codification Continues—Drop Forge Code Approved—Authorities Named

WASHINGTON, May 15. — Hearings have been held on proposed codes of fair competition for the mechanical press manufacturing industry, the paper and pulp machinery industry, the gas-powered industrial truck manufacturing industry and the multiple V-Belt drive industry. All four codes are similar in their major provisions. Each adopts the wage, hour and labor provisions of the basic code of the machinery and allied products industry. In each case the executive committee of the sponsoring organization is designated as temporary code authority for a period of 60 days from the effective date of the code and is directed to call an election by the industry at which permanent code authorities are to be elected.

Each permanent code authority is directed to develop a suitable method of cost accounting, applicable to its own industry, after which each member of each of the industries shall follow the method selected and approved in figuring his own costs, and selling below such costs is forbidden except in the case of dropped lines or seconds in which case due notice must be given the code authority before such sales take place. The mechanical press manufacturing code provides for open price lists. All four subdivisional codes contain provision for withdrawal from the basic code upon due notice to all concerned, including the Administrator, and by a two-thirds vote of all members of the industry entitled to vote.

Drop Forge Code Approved

General Johnson has approved a code of fair competition for the drop forge industry, making a total of 423 codes approved to date. Approval was given conditionally, the industry being required to cut the number of overtime hours permitted in any six-month period from 96 to 72, to delete the clause relieving subscribers to the code from the obligation to subscribe to any modification thereof; and to suspend effectiveness of the waiting period between filing and effective dates of price lists. General Johnson also stipulated that the continued participation of the American Drop Forging Institute in the code authority for more than 30 days would be dependent upon its making certain changes in its constitution and by-laws.

A code of fair competition for the machine screw nut industry, supplementary to the approved code for the fabricated metal products manufacturing and metal finishing and metal coating industry, has been approved, with the exception of a portion of article V, section 2, which prescribes a

waiting period between the filing with the code authority and the effective date of price lists. The action of this section is stayed, pending a further order from General Johnson.

The code for the cap screw industry, also supplementary to the fabricated metal products code, has been approved and was effective May 13. As a divisional code, this code adopts the wage, hour and labor provisions of the basic code.

General Johnson has approved the code for the wire machinery builders' industry, as a supplemental code to the machinery and allied products industry code. Sponsored by the Wire Machinery Builders Association, the code provides for an administrative body of six men, five representing the association and one to be chosen by members of the industry who do not belong to the association. A uniform method of cost accounting is to be set up for the guidance of the members of the industry in figuring their own costs. The code is effective May 20.

The supplemental code for the bright wire goods manufacturing industry, as approved by General Johnson, carried with it a stay of the provision of the code which prescribes a waiting period before filed prices become effective. It will go into effect on May 17.

Modifications to the code for the farm equipment industry, which would widen the scope of the code to include the members of the Barn Equipment Association, Poultry Equipment Association, Bee Equipment Manufacturers Association, National Association of Silo Manufacturers, Incubator Manufacturers Association and Sheet Steel Farm Equipment Association have been approved. Sales by members of the industry to governmental agencies are not governed by the code.

Objections To Be Received

Objections to schedule A of the code of fair competition for the screw machine products manufacturing industry may be filed in Room 4035, Commerce Building, prior to June 27. The code, supplemental to the fabricated metal products manufacturing and metal finishing and metal coating industry, was approved on April 28 on condition that the provisions of schedule A be stayed for 60 days. Schedule A provides a uniform cost estimating formula, and stipulates that estimates made by members of the industry, regardless of the estimating methods employed, shall result in an estimated cost that in no case would be less than a cost which would be reached by the use of the method set forth herein.

Written objections to the proposed modifications to the buff and polishing wheel industry's code will be received up to May 23 and may be filed in Room 4036, Commerce Building. It is proposed to modify the code in order to provide for the support of the code authority, by budgeting expenses, levying against the industry and submitting all figures to the administrator for his approval.

An interpretation of the electrical industry's code will permit the Elliott Co. of Ridgway, Pa., to complete on time engines and other equipment for four United States Navy submarines. Officials of the company complained that the 36-hr.-week restrictions under the electrical code would make it impossible for them to fulfill their contracts to supply motors for four navy submarines within the time specified in their contracts.

Code Authorities Named

Code authorities for a number of industries have been named as follows:

Steel Plate Fabricating Industry: Bryan Blackburn, R. D. Cole Mfg. Co., Newman, Ga.; H. G. Tallyday, Western Pipe & Steel Co., San Francisco; M. J. Trees, Chicago Bridge & Iron Works, Chicago; A. O. Miller, Petroleum Iron Works, Sharon, Pa.; V. P. Marran, Walsh Holyoke Steam Boiler Works, Holyoke, Mass.; W. F. Perkins, Bartlett-Hayward Co., Baltimore, and C. M. Denise, McClintic-Marshall Corun., Bethlehem, Pa.

Paper Printing Press Industry: I. K. Stone, Duplex Printing Press Co., Battle Creek, Mich.; L. W. Brueshaber, Goss Printing Press Co., Chicago; H. M. Tillinghast, R. Hoe & Company, Inc., New York; D. J. Scott, Walter Scott & Co., Plainfield, N. J., and H. A. W. Wood, Wood Newspaper Machinery Corp., New York.

Shovel, Dragline and Crane Industry: W. M. Bager, chairman, Bucyrus Co., South Milwaukee, Wis.; T. H. Watters, Marion Steam Shovel Co., Marion, Ohio; D. B. Patterson, Harnischfeger Corp., Milwaukee; W. S. Ramsay, Bay City Shovels, Inc., Bay City, Mich.; C. A. Owens, Osgood Co. & General Excavator Co., Marion, Ohio; H. C. Brown, Industrial Brownhoist Corp., Bay City, Mich., and C. B. Smythe, Threw Shovel Co., Lorain, Ohio.

Foundry Supply Industry: Theodore Kauffmann, S. Obermayer Co., Chicago; J. H. Whitehead, Whitehead Bros. Co., New York; W. J. Cluff, Frederick B. Stevens, Inc., Detroit; H. M. Riddle, Jr., Asbury, N. J.; A. S. Harvey, United States Graphite Co., Saginaw, Mich.; B. S. Stephenson, American Radiator & Standard Sanitary Corp., New York, and Ralph Ditty, Cleveland.

Cylinder Mould and Dandy Roll Industry: P. S. Sinclair, Sinclair Co., Holyoke, Mass.; Chas. E. Hayden, Chas. E. Hayden Mill Supply Co., Springfield, Mass.; Walter G. Trotman, C. H. Smith Corp., West Springfield, Mass.; John W. Gleeson, Thos. E. Gleeson Co., East Newark, N. J., and R. G. Edwards, Cheney Bigelow Wire Works, Springfield, Mass.

Gas Appliances and Apparatus Industry: Chairman, John A. Fry, Detroit-Michigan Stove Co., Detroit; Mabon P. Roper, George D. Roper Corp., Rockford, Ill.; F. J. Hoenigmann, Cribben & Sexton Co., Chicago; W. T. Rasch, American Gas Products Corp., New York; M. H. Feldman, John Wood Mfg. Co., Conshohocken, Pa.; Carl E. Froelich, Continental Stove Corp., Ironton, Ohio; E. C.

Adams, Adams Bros. Mfg. Co., Pittsburgh; Frank H. Adams, Surface Combustion Corp., Toledo, Ohio; E. L. Payne, Payne Furnace & Supply Co., Beverly Hills, Cal.; Donald McDonald, American Meter Co., New York; H. A. Wilson, Wilcolator Co., Newark, N. J.; Arthur Friedman, Cleveland Heater Co., Cleveland; F. H. Knapp, Lawson Mfg. Co., Pittsburgh, and F. E. Seilman, Electrolux Refrigerator Sales, Inc., New York.

Textile Machinery Manufacturing Industry: David F. Edwards, Boston; John F. Tinsley, Worcester, Mass.; B. H. Bristow Draper, Hopedale, Mass.; E. Kent Swift, Whitinsville, Mass.; Samuel F. Rockwell, North Andover, Mass.; Parkman D. Howe, Boston; E. H. Peirce, Stonington, Conn.; J. E. Butterworth, Philadelphia, and J. J. Kaufman, Philadelphia.

Great Lakes Steel Gets Labor Complaint

WASHINGTON, May 15.—Involving a complaint by four members of the Great Lakes Lodge of the Amalgamated Association of Iron, Steel and Tin Workers, the National Labor Board has cited for hearing today the Great Lakes Steel Corp., Ecorse, Mich. The company has been asked to show cause why the board's findings requiring the reinstatement of two employees, George Hynes and George Richards, members of the union, should not be transmitted to the compliance division of the NRA and the Department of Justice. The board charged that the company had not complied with its request that the men be reinstated, who, it was claimed had been discharged for union activity.

The board recommended that unless its decision was complied with or the company gives "other adequate redress to the parties injured by its violation of Section 7 (a) of the NIRA, and shall have expressed an intention hereafter to comply therewith, its Blue Eagle be removed and legal proceedings be instituted against it." The four union members appealed to the National Labor Board after the Detroit Regional Labor Board had exonerated the steel company of any violation of the steel code.

Manchukuo has a ten-year plan for the economic development of the country, part of which calls for an additional 2000 miles of railroads. The State Railways have placed orders for 60 locomotives and 100 coaches in Dairen and Japan, and purchases of 20 locomotives, 600 goods wagons, and 62 coaches are contemplated. Manchukuo has a provisional agreement with France for the importation of iron and steel products, machines, etc., which the Japanese industry does not produce.

The Bureau of Supplies and Accounts, Navy Department, will open bids June 5 on 50 tons of class Bs, special heat-treated bars for the Washington Navy Yard.

Miss Perkins Finds Automobile Style Changes Absurd—Objects To Gadgets

WASHINGTON, May 15.—Standardization of the motor industry has been suggested by Miss Frances Perkins, secretary of labor, as a solution for its production and unemployment problems. Putting style into the automobile is one of the most absurd things the industry ever did, she says, referring to the resulting recurrent peaks and valleys in production. Manufacturers, she declares, have worked hardships on employees by holding designs for latest streamlines and new gadgets until the last minute and then working at tremendous pressure to get them out ahead of their competitors. Producers might improve conditions by limiting new styles for cars through NRA codes, in her opinion.

"I'm one who thinks that the old model-T Ford was a great contribution to civilization," Miss Perkins explains. "It seldom changed and it made for a stabilized industry." She did not bother about telling where the up-and-coming Ford company would be, if anywhere, had it stuck to the model-T.

Miss Perkins also thinks automobiles used to be planned to give longer service than are the models today. Even expensive cars today, she says, don't hold up over two years. Producers stand ready to disprove this point. More stabilization might also be obtained if progressive prices were established on automobiles to encourage buying in the summer and fall and to lessen it in the normally active spring, says Miss Perkins. This, she thinks, might do away with the need for a plant working three shifts a day for a few months and then using only one shift the remainder of the year.

Motor manufacturers are still trying to work out the seasonal problems but have not rallied to the ideas offered by Miss Perkins.

Why Stop With Model

If adopted, there are those who wonder what would become of initiative, vision, research, science, engineering, new steels, new and improved metal-working machinery, etc., etc. If adopted, why remain content with the relatively modern model-T Ford? it has been asked. Why not go beyond primitive man who discovered the principle of the wheel? it has been further asked. That done and there would be little or no employment and no modern problems with which progress has plagued civilization.

Stabilization of the motor industry, which inevitably will have an ef-

fect on the steel, metal-working and other industries in supplying requirements, is being studied, and it is reported that it has supplied material of this sort to the NRA. An early report is expected to be made.

Fabricators in Central West Protest Steel Code

THE Central Fabricators Association, 53 West Jackson Boulevard, Chicago, a regional group including in its membership 75 per cent of the independent structural steel shops operating in the territory centering about St. Louis, has filed with Gen. Hugh S. Johnson, National Recovery Administrator, a protest against the system of basing points in the iron and steel code. Charging that this system "permits the dumping of steel from one mill territory into another," the association claims "that mills are selling steel outside their logical territories at from \$3 to \$8 a ton below the prices at which they sell to their logical customers located in the same territory as the mills."

"The steel code," the protest continues, "has resulted in materially increasing the costs of the structural steel fabricating industry, as is to be expected, which increase in cost is not reflected in the present selling prices of fabricated structural steel, owing principally to the prices quoted by and the selling methods of the fabricating companies owned and operated by the larger rolling mills themselves."

Trackwork Production Heavier in April

PRODUCTION of trackwork for T-rail track of 60 lb. per yd. and heavier amounted to 6132 net tons during April, according to the American Iron and Steel Institute. In the preceding month, output was 4446 tons, while production in April, 1933, was only 1662 tons.

SERVICE MACHINE Co., 750-760 Broadway, Elizabeth, N. J., has appointed the Production Machinery Sales Co., Inc., in Detroit, as its sales representative for its line of presses, dies, tools and special machinery.

L. Heres DeWyk & Son, Derby, Conn., have been appointed sales representatives in the New England States for the Production company.

Thos. F. Donnelly, of Westfield, N. J., has been added to the local sales force of the company.

PERSONALS

SIDNEY G. McALLISTER has been named first vice-president and a member of the board of directors and of the finance committee of the International Harvester Co. Mr. McAllister has been with the Harvester company since 1897. In 1914, he was sent to Europe where he remained for 17 years, part of the time as European works manager. He was recalled in 1931 and elected a vice-president. In 1932, Mr. McAllister was given charge of the manufacturing and engineering department.

♦ ♦ ♦

DEXTER A. TUTEIN has been appointed resident industrial advisor on the Industrial Advisory Board of the National Recovery Administration at Washington. Formerly identified with the pig iron trade in the East, Mr. Tutein has been recently engaged in making a survey on behalf of bondholders and H. M. Byllesby & Co. in connection with the reorganization of the St. Louis Gas & Coke Corp.

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B. D. KUNKLE has been appointed assistant to C. E. WILSON, vice-president of General Motors Corp., in charge of accessory manufacturing divisions, with headquarters at Detroit. Since 1930 he has been president and general manager of the Delco Products Division of General Motors at Dayton, Ohio. He has had wide experience in electrical engineering and automobile accessory manufacturing activities. From 1910 to 1916 he was with the Westinghouse Electric & Mfg. Co., in the latter year becoming superintendent and chief engineer of the Caskey-Dupree Co., Marietta, Ohio. During the World War he was chairman of the manufacturers' committee of the Grenade Association. In 1922, Mr. Kunkle returned to the Westinghouse company as assistant superintendent in charge of manufacture of automotive equipment, resigning in 1925 to join General Motors. He has successively been associated with the Delco-Remy plant at Dayton, the Frigidaire Corp., and the Delco Products Division. He is a vice-president of the Sunlight Electrical Division of General Motors at Warren, Ohio.

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FRANK H. PRESCOTT has succeeded Mr. Kunkle as president and general manager of the Delco Products Division. In 1915, he became connected with the automotive equipment division of the Westinghouse company. During the war he was a lieutenant in the Army Corps of Engineers, at the end of the conflict going to the Remy Electric Co. at Anderson, Ind., as a member of the designing and engineering staff. He was made assistant chief engineer and then chief engineer. On Jan. 1, 1933, he was

made president and general manager of the Guide Lamp Corp., Anderson, Ind., division of General Motors Corp.

♦ ♦ ♦

F. L. BURKE has been made president and general manager of the Guide Lamp Corp. to succeed Mr. Prescott. He joined General Motors in 1921 as a production engineer in Detroit. Two years later he was given a special assignment with the Indiana Lamp Co. at Connersville, Ind. In 1926, he was transferred to the Remy Electric Corp., at Anderson, as a plant superintendent and in 1930 was made factory manager of the Guide Lamp Corp.

♦ ♦ ♦

RALPH P. BROWN, formerly in charge of publicity for the National Lime Association and the Brown Instrument Co., has joined the advertising department of the Timken Roller Bearing Co. and the Timken Steel & Tube Co., Canton, Ohio.

♦ ♦ ♦

LEONARD L. KING has been appointed assistant purchasing agent by the Illinois Central Railroad. He entered the service of the company in 1902 and became special assistant to the purchasing agent in 1919.

C. F. CRUCIGER, vice-president of Spang-Chalfant & Co., Pittsburgh, has been appointed administration member to the code authority for the industrial furnace manufacturing industry.

♦ ♦ ♦

WILLIAM P. WITHEROW, president of the Steel Products Co., Pittsburgh, formerly president of the Witherow Steel Corp. and later vice-president of the Republic Steel Corp., was elected as a member from the second election district of the National Council of the Chamber of Commerce of the United States at the annual meeting of the chamber in Washington.

♦ ♦ ♦

L. B. KNIGHT, JR., has been made vice-president and sales manager of the National Engineering Co., Chicago. A. C. CHRISTENSEN has been appointed vice-president and chief engineer.

♦ ♦ ♦

ALAN J. PARRISH, of Paris, Ill., has been made administration member to the code authority for the steel plate fabricating industry.

♦ ♦ ♦

H. J. SALADIN, formerly assistant manager of the technical division of the Standard Oil Co. of Indiana, has been made manager of the technical department.

OBITUARY

WILLIAM ELLIS COREY, formerly president of the United States Steel Corp., died of pneumonia at his home in New York on May 11. Mr. Corey was 68 years of age at the time of his death and had been retired for the past five years.

Known as "one of the Carnegie



W. E. COREY

boys," Mr. Corey came under the eye of the famous ironmaster while employed in the chemical laboratory of the Edgar Thomson Works of Carnegie Brothers & Co., having entered this employment at the age of 16. Five years later he was made superintendent of the plate mill of the same works, to which additional responsibilities were shortly added in the form of supervision of the open-hearth and slabbing departments.

In 1893, Mr. Corey was made superintendent of Carnegie's armor plate department at Homestead and while in this position made his invention of the Corey reforcing process which added valuable ballistic qualities to armor plate and which received almost universal adoption. He retained this position until 1897 when he became general superintendent of the Carnegie works, succeeding CHARLES M. SCHWAB. Four years later, he again succeeded Mr. Schwab to the presidency of the Carnegie Steel Co., the latter becoming first president of United States Steel Corp. Two years later, in 1903, when Mr. Schwab resigned to become president of Bethlehem Steel Co., Mr. Corey succeeded him as president

of Steel Corporation. He retained this position for eight years, being succeeded by JAMES A. FARRELL in 1911.

In 1915, Mr. Corey became president and chairman of the board of Midvale Steel & Ordnance Co., remaining in this position until 1923. At his death, he was a director in many companies, among them, Baldwin Locomotive Works, Vanadium Corp. of America, International Nickel Co., International Motor Truck Co., Mack Trucks, and Mesabi Iron Co.

WILLIAM A. BLACK, vice-president and general manager of the Automatic Products Co., Detroit, manufacturer of cold-finished steel bars, died on May 10 at Harper Hospital in Detroit after a short illness.

J. ASA PALMER, president and general manager of the Burt Mfg. Co., Akron, Ohio, died on May 1, aged 66 years. Two years after his graduation from Buchtel College in 1889 he became affiliated with Aultman-Miller & Co., Akron, continuing with the company until 1903 when he entered the employ of the Burt company. A year later he was made secretary and in 1921 was elected to the positions he held at the time of his death.

EDWIN L. CROSBY, founder and president of the Detroit Electric Furnace Co., Detroit, died on May 5 in Ludlow, Mass., as a result of injuries sustained in an automobile accident. He was born in Plymouth, Mich., 51 years ago. After his graduation from the local schools, he entered the employ of the Semet Solvay Co., completed a course of study in electrical engineering and for several years had charge of electrical operations for that company. In 1905 he joined the staff of the Detroit Edison Co., and for 13 years was chief power salesman. He resigned in May, 1918, to organize the Detroit Electric Furnace Co., serving as vice-president and general manager until 1920, when he became president. Mr. Crosby was a member of the Electrochemical Society and of the American Foundrymen's Association.

LEONARD G. WOODS, president of Union Spring & Mfg. Co., Pittsburgh, died at his home in that city on May 13.

Machine Tool Orders Drop

THE April index of machine tool orders is 47.0, according to the monthly report of the National Machine Tool Builders Association. This compares with 48.9 in March.

Administration's Housing Program Offers Wide Outlet for Steel

WASHINGTON, May 15. — Some observers here are watching with interest the prospect of promoting the building of steel structures in connection with the housing program submitted to Congress today by President Roosevelt for enactment at the present session of Congress. Recommended to the President by the National Emergency Council, the program, if adopted and proved workable, offers a wide outlet for steel, it is said, and gives the industry an opportunity to expand efforts which it has begun to take up seriously.

It is the view of Frank C. Walker, executive director of the council, that from any one of several points, an attack on the housing problem can at the present time be made a major factor in economic readjustment. In the first place, he pointed out, the construction industry as a whole is outstanding among the large industries of the United States. Furthermore, he stated, it has been the most severely depressed of the large industries, and the one that has shown the least response during the past year to the general economic recovery. To show the extent of the decline in the construction industry, he explained that the former annual aggregate of construction was \$11,000,000,000, as compared with the existing aggregate of \$3,000,000,000, while the former annual residential construction involved \$3,000,000,000, as against the present volume of only \$300,000,000.

The real estate mortgage debt of the country was placed at \$43,000,000,000, the largest single class of outstanding long-term indebtedness in the capital market. Of this mortgage indebtedness, \$21,000,000,000, or approximately half the total, is represented by individual mortgages on homes, much of which, Mr. Walker said, was created under unsound financial practices that prevailed during the boom conditions of 1922-29.

The program, as announced by the President, contemplates modernization, mortgage insurance, mortgage associations, and insurance of building and loan associations.

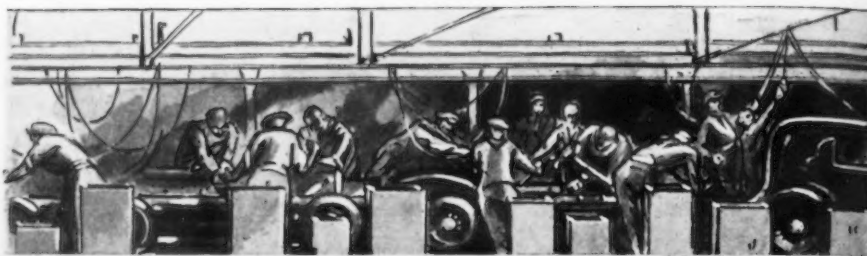
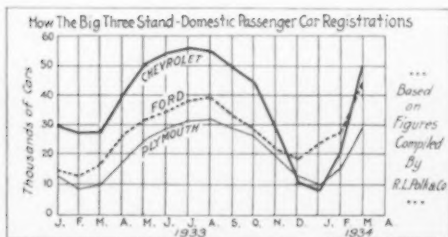
Regarding modernization, Mr. Walker explained that after five years of neglect of the ordinary maintenance of residential, commercial and industrial properties, a widespread potential demand now exists for construction in the field of repairs, renovation and modernization. By providing definite incentives in the way of reasonable costs and advantageous credit terms, he stated, there can be stimulated a renewal of activity and employment in the kind of construction, both urban and rural, in which substantial results can be most quickly

obtained. It was pointed out that a modernization campaign and a plan of home-improvement credit has been proposed as a means of inducing the prompt undertaking of this work. The modernization project would embrace commercial and industrial property as well as residential property. The special credits that have been proposed, however, would be limited to a maximum of \$2,000 each and hence would be availed of for the most part by home owners.

In explaining the mortgage insurance feature of the program, Mr. Walker said that it proposes mutual mortgage insurance, under Governmental direction, as one of three principal means of reopening the mortgage market. He claimed that by insuring mortgages on existing homes up to 60 per cent of their currently appraised value, private capital can again be induced to invest more freely in mortgages. By offering to insure mortgages on newly completed homes, but to 80 per cent of the appraised value, he said, new construction will be enabled to go forward without any occasion for reviving the second mortgage market. Mortgages would be insured, however, only where the insurance would be beneficial to the mortgage market, it was stated, and no construction of a speculative type would be eligible to mortgage insurance, nor would the insurance be granted in areas where there is an outstanding surplus of modern homes.

As another important means of reopening the mortgage market, the authorization of privately owned and operated mortgage associations, to be incorporated under Federal charter, it was stated, has been proposed. By placing these associations under rigid Federal supervision and restricting their dealings to the insured mortgages, Mr. Walker said, an effective means can be provided to attract funds from financial centers in which there is a surplus of capital for investment to areas in which local savings are insufficient to meet the requirements of home financing and in which the local cost of such financing is therefore unduly high. In this manner, it was stated, the advantage of low-cost, long-term financing can be spread to communities throughout the country.

It was also stated that the insurance of the shares and certificates of sound building and loan associations has been proposed as still another important means of reopening the mortgage market. Mr. Walker said these institutions have been placed at an inequitable disadvantage since the insurance of bank deposits was put into effect at the beginning of the present year.



THIS WEEK ON THE

Strikes Again Curtail Automobile Output — Downtrend Accelerated

DETROIT, May 15.

AT the end of the first half of May, the fact is increasingly evident that automobile production passed its peak last month. Developments the past week deepen the impression in automotive circles that a reversal of the downward trend in retail sales is not likely to occur and thereby perhaps stimulate another spurt in output.

There are so many factors contributing to the decline in operations that it would be incorrect to pin the responsibility on any single incident. An ill-timed increase in retail prices, unfavorable weather, the ending of the CWA program and the relatively high delivered prices of all so-called "economy" cars were cited in this column a week ago as outstanding reasons why the industry's peak for 1934 came so early in the year.

To these factors should be added the effects of the nation-wide drought. From the standpoint of the motor car industry, the damage done by the drought looms especially serious because the greatest gains in retail sales this year have been made in agricultural areas. It is too early to tell definitely what turn sales will take in farming districts, but automotive sales executives are viewing the situation with unusual concern.

Lack of Confidence Hurts Sales

Still another unfavorable influence is being felt on sales. The country seems bogged again in another mire of jitters. A lack of confidence is manifesting itself in the automobile industry as well as in other directions. Part of this hesitancy is due to perception on the part of industry generally of a summer's slump ahead and

speculation as to what the Roosevelt Administration can do, if anything, to ease its effects.

Then there is the matter of the Congressional elections. The motor car industry, of course, has no way of knowing what will happen in November at the polls. A setback to the Administration might have a profound influence in changing Mr. Roosevelt's objectives, particularly in relation to control over business. On the other hand, a hearty indorsement might give the Administration courage to lean farther toward the left. So long as this uncertainty exists, the automobile industry is becoming increasingly cautious about committing itself to sizable expenditures for equipment.

This attitude is exemplified in two specific cases. Pontiac Motor Co. has a buying program for its proposed six outlined and is ready to proceed with the purchase of at least half a million dollars' worth of machine tools. However, the General Motors management at New York has not yet approved the spending of this money and until it does no action can be taken by officials of the Pontiac company.

Chrysler Postpones Buying Program

Chrysler divisions are understood to have mapped out a buying program which would have meant the placing of large equipment orders about July 1 for next year's models, but Mr. Chrysler has withheld his indorsement. This is not to be interpreted as a casting of a negative vote against the program, for it may still be carried out as originally planned. However, it has been postponed.

Further complicating the general situation is the restlessness of labor. One strike is hardly cleared up until

another one is called. Emissaries of the American Federation of Labor are working tirelessly to unionize the industry, so that the status in each plant is constantly changing. This naturally works against long-time planning, because management scarcely knows from one week to the next what its costs are.

The uncertainty of the labor situation has been responsible for shoving forward the year's production peak. That is, the automobile industry, with the labor pot boiling, found it advantageous to turn out as many finished cars and to make as many parts as possible while employees stayed on the job.

Large Volume of Parts Stored

The inevitable result is that many manufacturers are understood to have cars in warehouses and in other storage places around the country. Car plants are full of parts stored for use in future assemblies. One company in particular has rented outside storage space, including the old Studebaker plant on Brush Street, where complete motors and other parts are now being held. In some items, the volume of material on hand is reported to be enough to meet requirements for the next 60 days.

Concurrent with this overbuilding of parts and of finished cars by some companies has been a shortage of parts, especially bodies, by General Motors divisions growing out of the recent strike at the Fisher Body plant in Cleveland and the present strike at Fisher Body plant No. 1 in Flint, Mich.

Chevrolet manufacturing divisions worked only four days the past week because bodies were not available, al-

though scheduled Buick bodies to close when F out. B its "40" put in the su dealers number Even in assembly plants a likely t week.

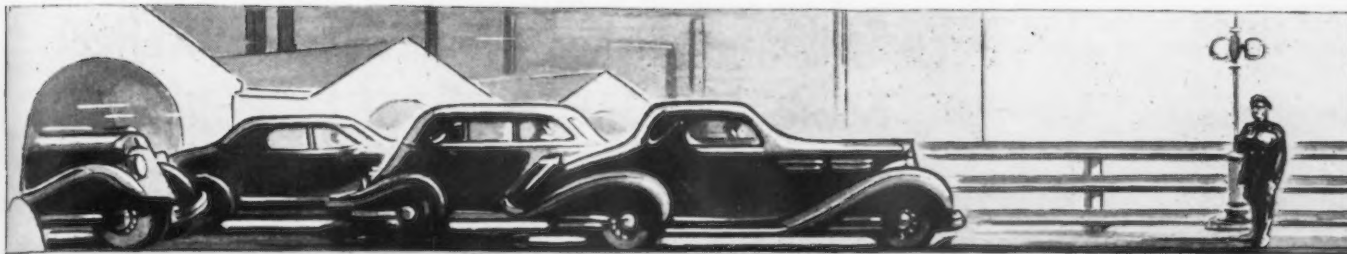
Strikes

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ASSEMBLY LINE

though it is hoped that a five-day schedule can be resumed this week. Buick was having difficulty securing bodies early last week and finally had to close down completely on Thursday when Fisher union employees walked out. Because of the announcement of its "40" series on Saturday, Buick is put in an embarrassing position by the suspension of operations. Its dealers are said to have only a limited number of the new models on hand. Even if Buick is enabled to resume assemblies shortly, its parts departments are so far ahead that they are likely to be idle for at least another week.

Strike Delays G. M. Production

Fisher plant No. 1 at Flint is reported to make not only Buick bodies but also some Cadillac bodies and a large number of stampings for the Oldsmobile sixes and eights. Thus the current strike at Flint affects three divisions of General Motors. Olds already had been subjected to longer delay than any other General Motors division in putting its new cars into volume production, so that the present setback is regarded as particularly unfortunate.

All of these considerations are having an adverse effect on automobile production. Operations were curtailed considerably the past week, with the exception of the Ford Motor Co. It is almost impossible to tell today what the total output will be this month, in view of the disconcerting factors which have been injected into the situation. It will be over 300,000 units, but how far above that line cannot be determined just now.

It is safe to say that Chevrolet will fall short of 100,000 units in May, although original plans called for assemblies in excess of that figure. Pontiac, as mentioned last week in this column, has sliced its operations in half, while Buick and Olds are handicapped by the Fisher strike. Cadillac is probably less affected than any other General Motors division.

Chrysler Corp. is hardly expected this month to equal its April record of 82,481 units. Plymouth assembled

By **BURNHAM FINNEY**
Detroit Editor, **THE IRON AGE**

45,850 units last month, and is continuing near this all-time high rate during May. Hudson is understood to have further reduced its activities to about 13,000 cars a month, compared with 21,000 in April.

The obvious fact that a summer lull in assemblies lies ahead and that production runs of 1934 models probably will be cleaned up before the end of the third quarter have dampened the hopes of the steel trade for large tonnage releases against old contracts. Much to the surprise of steel mills, orders from the automobile industry in May have been running considerably below the April average. It is generally conceded that motor car companies do not intend to speculate and will content themselves with laying in a 30 days' supply of steel.

Costly experiences with steel which was stored last year, the imminence of new models, and the small increase of \$3 a ton in the heavier steel products, which is not enough to be an incentive for large purchases, are the main reasons for the decision to refrain from much speculative buying.

Chevrolet to Buy Steel

To even up stocks, Chevrolet shortly is expected to buy steel for about 50,000 cars for June delivery. Ford, whose production has been the best sustained in the entire industry, has been taking steel at a steady rate, but the pressure for quick shipments into the Rouge plant has eased.

Hudson is said to be preparing a new, low-priced Terraplane for early announcement. It probably will bear the same relationship to the present Terraplane as the standard Chevrolet does to the Master series. No new sizes of steel are required for the proposed job, the company using stocks now on hand.

What about independent suspension

for next year's cars? Despite all the stories about abandonment of knee-action springing, it can authoritatively be stated that independent springing in some form will be continued on 1935 models by those companies which now are committed to this system. That the manufacture of front-end units is too costly is generally conceded throughout the industry, and a diligent search is being made for ways and means of paring down this expense. Perhaps the Leaf Spring Institute of Detroit has found a way out. It has perfected an independent front wheel design using double transverse leaf springs in conjunction with double-acting shock absorbers, the front axle being eliminated. This new unit, designed to compete with the coil spring type made by General Motors and Chrysler in their own plants, is the result of the cooperative efforts of leaf spring manufacturers throughout the nation.

The design of the new unit is an unequal arm parallelogram type, with the two conventional transverse springs mounted side by side forming the lower member of the parallelogram, and the arms of hydraulic shock absorbers forming the upper or shorter member. A spring seat of new design has been incorporated which permits the progressive shortening of the springs under deflection.

In this construction a factor has been developed permitting springs to retain the standard oscillation periods under normal road shocks, but increasing the spring stiffness progressively under varying deflections. By the use of a progressive spring, the increased stiffness set up through the progressive shortening of the springs is said to make possible high speeds on rough roads.

The front-end unit of present design with coil springs weighs 144 lb., whereas the new leaf spring unit weighs only 94 lb. Lower cost of production, ease in adapting the unit to mass production assembly methods, ease of servicing, and improved riding and steering, are among the advantages claimed for the new unit. An experimental unit, placed on a 1934 car, has been subjected to severe tests

with excellent results. Plain carbon steel was used in the manufacture of this unit.

Expansion in Local Flat Rolled Steel Capacity

Production capacity for flat-rolled steel at Detroit is scheduled for considerable expansion before the present year ends. The Ford Motor Co., of course, will provide the biggest increase in tonnage through construction of a continuous sheet mill and installation of equipment for making cold-rolled as well as hot-rolled sheets. The company also will be in a position to manufacture hot-rolled strip steel for frame stock for its V-eight cars.

Last week the McClouth Steel Corp., which is allied with the Consolidated Steel Corp., a steel jobber in the southwestern section of Detroit, ordered a 20-in. reversing hot strip mill of the Steckel type and will make strip up to 12-in. in width and in coils of 3000 lb.

Now comes the unofficial but well authenticated report that the Rotary Electric Steel Co. is preparing to add to its facilities so as to make cold rolled strip up to 10 in. in width.

Rotary is able to roll hot strip steel on its existing equipment and is expected to put cold rolling mills into a new building 700 ft. long, the construction of which has just started. This expansion program will give the Rotary company a nicely balanced output of cold-drawn bars and cold-rolled strip steel.

Chevrolet Sales Pass 100,000 in April

April was the first month in three years during which sales of an automobile manufacturer passed the 100,000 mark. World sales of the Chevrolet Motor Co. last month amounted to 100,046 units, raising its total for the first four months of the year to 281,033 units. Ford is running almost even with Chevrolet, its world sales for the same period being 278,553 units. In the United States retail deliveries of the Ford company were 214,733 units compared with 77,758 units in the corresponding months of last year.

Detroit Notes

Olds is building six-cylinder motors for use in the new General Motors Truck's 1½-ton truck, which was recently announced. Olds dealers are understood to be handling this unit in addition to Oldsmobile passenger cars. . . . Chrysler Corp. has purchased from General Motors Corp. the old LaSalle plant at 9414 Saxton Avenue in the west part of Detroit, not far distant from Ford's Rouge plant. . . . Exports are booming, with April shipments abroad of General Motors, amounting to 20,201 units, the highest recorded for any year in the corporation's history, except 1928 and 1929.

Strike at Fisher Plant in Flint Reflects More Militant A. F. of L. Policy

DETROIT, May 15—The strike of American Federation of Labor employees of Fisher Body plant No. 1 in Flint which began last Thursday was still in full swing today, with apparently little chance of an immediate settlement being reached.

The strike came after two so-called "sit-downs" had occurred. About ten days ago workers in the sanding and spraying departments refused to work, sitting down for a time while unfinished bodies piled up. The second protest was on Wednesday when body trimmers left their machines. The climax came Thursday when 200 men paraded through the plant and announced a strike. Since then the plant has been heavily picketed. Reasons given for the strike are: (1) A cut in piece work rates of 25 to 40 per cent and attempts to make men work faster, (2) refusal of the company to meet a committee reputed to represent employees, (3) discharge of workers who protested against the reduction in piece work rates, and (4) refusal of the company to return to work employees who were to be taken back under an agreement with the Automobile Labor Board relative to discrimination cases.

The strikers are demanding that (1) all employees shall be returned to work, including those discharged for protesting against piece work rates; (2) the speed of the production lines shall be reduced; (3) piece work rates on the new Buick 40 shall be revised so that men can earn as much as on other Buick models, and (4) the company shall recognize representatives of organized workers and guarantee to cease all discrimination and return to work all discrimination cases.

Meyer L. Lewis, A.F.L. organizer, is in charge of the strike, assisted by Lewis Hart, who had charge of the A.F.L. walkout at the Fisher plant in Cleveland recently. The apparently militant attitude of the Fisher workers at Flint is said to be the result of a determination on the part of the A.F.L. generally to be more liberal in granting permits to Federal and local unions to strike in order to get a satisfactory and prompt settlement of alleged grievances. Much discontent has arisen in labor circles because of the policy of mediation pursued by the Automobile Labor Board, which is disinclined to use a big stick. William Green, A.F.L. president, is reported to have said that if strike is the only language some persons can understand "we will have to use their language. We will not turn back in the contest with the motor masters."

The executive council of the federa-

tion has endorsed a proposal by William Collins, A.F.L. organizer at Detroit, to set up a research bureau in Detroit to gather accurate data as to wages, job classifications and costs in the automobile and allied industries. Mr. Collins points out that, under the present system of one plant bidding against another for work, the manager quoting the lowest price gets the business. This system makes anything like equal distribution of work impossible, forces lower wages, and further speeds up operations.

The more militant policy of the A.F.L. is likely to result in an increased number of strikes, not only in the automobile industry but in other industries. Now that the production peak has been passed at Detroit and men necessarily are being laid off, it is believed that the situation may be aggravated because union leaders are almost sure to seize upon the opportunity to claim that members of the A.F.L. are being discriminated against. At a special meeting Sunday to which tool and die makers employed by the Ford Motor Co. were invited the Mechanics Educational Society took up the matter of a so-called lockout recently by the Ford company against 600 craftsmen. In one department at the Rouge plant. It was claimed that these men had been deliberately laid off because of their membership in the M.E.S. The men at the meeting voted to return to work if the Ford company sent them "return to work" cards. It was asserted that a majority of the men had been returned to their jobs in the last ten days. Major credit for the return of the men was given to the Automobile Labor Board.

Detroit Scrap Prices Still Declining

DETROIT, May 15.—With demand for scrap continuing at low ebb, prices again have retreated 25c. to 50c. a ton. Hydraulic bundles, which have been commanding a premium over heavy melting steel for many months, have declined to the same basis as the latter. A few boatloads of scrap are going out of Detroit to Cleveland, Lorain and Buffalo, but the volume is far below that of several weeks ago. Steel mills generally are still insisting upon hold-ups of shipments on current contracts.

Mackintosh Hemphill Co. has removed its offices from the Point Building to its Garrison Plant, 901 Bingham Street, Pittsburgh.

SUMMARY OF THIS WEEK'S BUSINESS

Steel Production Rises Further As Outlook Grows More Obscure

**Decline in Scrap, Recession in Automobile Industry, Labor Unrest
And Drought Contribute to Uncertainty—Large Railroad Orders Placed**

STEEL production has made another gain of one point to 61 per cent of capacity, but the peak of operations is believed to be near and the outlook for coming months is obscure. Foremost among factors contributing to waning confidence is the belief that current accumulations of material, prompted by recent price advances, will rob the third quarter of tonnage. The common apprehension of a sharp drop in mill operations after June 30 is reflected in the uninterrupted fall in scrap prices, which this week declined from \$11.92 to \$11.67 a ton, or only slightly above the year's low of \$11.33 registered on Jan. 2.

Other disturbing influences are the epidemic of strikes which is sweeping the country, the continuance of drought in the West relieved only by local rains, and the slackening pace of the automobile industry.

THE extent to which iron and steel inventories are being built up is difficult to estimate. The stocking of semi-finished steel at the mills in preparation for a rush of specifications from consumers in June has probably been completed. But, to date, pressure for steel from customers has been less than was expected and it is now believed that mills will have little difficulty in filling all commitments before July 1 except in strips and some finishes of sheets. Producers of sheets are now preparing to set final dates for the acceptance of releases so that they can meet the code deadline for shipments. At least one sheet mill has already closed its books to second quarter specifications.

THE evidences of increasing caution on the part of buyers reflect business prospects in general and the labor outlook in particular. The rising tide of industrial unrest has not only increased the uncertainty of costs but, in some cases, has raised doubts as to the possibility of continuing operations. Those who fear further increases in labor charges point to the example of one of the smaller steel mills which, after weathering the depression, was finally forced into receivership. Shortened hours and higher wage rates saddled on this company by the code were not offset by belated price advances.

Other deterrents to excessive stocking are the inability of consumers to anticipate their precise needs and fear of the deterioration of materials in storage. The automobile industry found it costly to store certain grades of steel last year, and during the current quarter will probably limit expansion of inventories to the heavier products.

It is not surprising, therefore, that specifications from the motor car builders are receding in step with their operations. It is encouraging, however, to note that releases from miscellaneous sources, although not showing further increases, are holding their own. Even in the case of tin plate, a product in which considerable stocking is known to have taken place, mill operations have received fresh support and are holding at 75 per cent of capacity. Whether or not this is due to fresh alarm over a possible steel strike is not yet ascertainable.

THE most encouraging market developments are the placing of additional railroad business, and the award of 11,000 tons of steel pipe by the Great Lakes Pipe Line Co. to the Milwaukee fabricator, the first large line pipe order to be closed in many months. Railroad buying is featured by the purchase of 25,000 tons of rails by the Union Pacific and 10,000 tons by the Reading. The Chicago Great Western has bought 500 steel box cars, while the Boston & Maine has ordered 10 deluxe coaches, 21 suburban passenger cars, 10 steam locomotives and four Diesel electric engines.

New structural steel projects include a new Rockefeller Center unit, New York, calling for 10,000 tons, the main span of the Tri-borough bridge in the same city, requiring 11,000 tons, and a section of the Philadelphia-Camden bridge, 5000 tons. Fabricated steel lettings for the week, though made up of small projects, total 15,800 tons, compared with 25,800 tons a week ago.

SUGGESTED code changes are being discussed this week at Washington by steel executives and NRA officials. The Administration is said to favor the abolition of the 10-day waiting period following price filings and recognition of water rates in quoting delivered prices. Elimination of the 10 days' notice would, in the opinion of the trade, open the doors to a return of "chiseling" competition and would work to the advantage of large buyers instead of the smaller buyers whom Washington authorities profess to be anxious to protect. Without the grace period, sharp concessions could be made by the simple device of filing a reduction and then immediately withdrawing it.

THE IRON AGE composite prices for finished steel and pig iron are unchanged at 2.222c. a lb. and \$17.90 a ton.

WESTINGHOUSE

MOISTURE

OIL

MILD CHEMICALS

METALLIC DUST

GRIT

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IS WORTHY OF
A GOOD MOTOR
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▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	May 15, 1934	May 8, 1934	Apr. 17, 1934	May 16, 1933
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia	\$20.26	\$20.26	\$19.26	\$15.34
No. 2, Valley furnace	18.50	18.50	17.50	14.50
No. 2 Southern, Cin'tl.	19.13	19.13	18.13	15.82
No. 2, Birmingham†	14.50	14.50	13.50	12.00
No. 2 foundry, Chicago*	18.50	18.50	17.50	16.00
Basic, del'd eastern Pa.	19.76	19.76	18.76	15.09
Basic, Valley furnace	18.00	18.00	17.00	14.00
Valley Bessemer, del'd P'gh.	20.76	20.76	19.76	16.89
Malleable, Chicago*	18.50	18.50	17.50	16.00
Malleable, Valley	18.50	18.50	17.50	14.50
L. S. charcoal, Chicago	24.04	24.04	24.04	23.17
Ferromanganese, seab'd car-lots	85.00	85.00	85.00	68.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$40.00
Light rails, Pittsburgh	35.00	35.00	32.00	30.00
Rerolling billets, Pittsburgh	29.00	29.00	26.00	26.00
Sheet bars, Pittsburgh	30.00	30.00	26.00	26.00
Slabs, Pittsburgh	29.00	29.00	26.00	26.00
Forging billets, Pittsburgh	34.00	34.00	31.00	31.00
Wire rods, Pittsburgh	38.00	38.00	36.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.70	1.70	1.60	1.60

Finished Steel

<i>Per Lb.:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.90	1.90	1.75	1.60
Bars, Chicago	1.95	1.95	1.80	1.70
Bars, Cleveland	1.95	1.95	1.80	1.65
Bars, New York	2.23	2.23	2.08	1.95
Plates, Pittsburgh	1.85	1.85	1.70	1.50
Plates, Chicago	1.90	1.90	1.75	1.70
Plates, New York	2.13	2.13	1.98	1.598
Structural shapes, Pittsburgh	1.85	1.85	1.70	1.60
Structural shapes, Chicago	1.90	1.90	1.75	1.70
Structural shapes, New York	2.10 1/4	2.10 1/4	1.95 1/4	1.86775
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	1.70
Hot-rolled strips, Pittsburgh	2.00	2.00	1.75	1.45
Cold-rolled strips, Pittsburgh	2.80	2.80	2.40	1.80

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. †Blue Eagle refinery.

Finished Steel

<i>Per Lb.:</i>	May 15, 1934	May 8, 1934	Apr. 17, 1934	May 16, 1933
	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.65	2.65	2.25	2.00
Hot-rolled annealed sheets, No. 24, Gary	2.75	2.75	2.35	2.10
Sheets, galv., No. 24, P'gh	3.25	3.25	2.85	2.70
Sheets, galv., No. 24, Gary	3.35	3.35	2.95	2.80
Hot-rolled sheets, No. 10, P'gh	2.00	2.00	1.75	1.40
Hot-rolled sheets, No. 10, Gary	2.10	2.10	1.85	1.50
Wire nails, Pittsburgh	2.60	2.60	2.35	1.85
Wire nails, Chicago dist. mill	2.65	2.65	2.40	1.90
Plain wire, Pittsburgh	2.30	2.30	2.20	2.10
Plain wire, Chicago dist. mill	2.35	2.35	2.25	2.15
Barbed wire, galv., Pittsburgh	3.00	3.00	2.85	2.35
Barbed wire, galv., Chicago dist. mill	3.05	3.05	2.90	2.40
Tin plate, 100 lb. box, P'gh	\$5.25	\$5.25	\$5.25	\$4.25

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh	\$12.75	\$13.25	\$14.25	\$11.75
Heavy melting steel, Phila.	11.25	11.25	11.75	9.25
Heavy melting steel, Ch'go.	11.00	11.25	11.75	8.50
Carwheels, Chicago	11.25	11.50	11.75	9.50
Carwheels, Philadelphia	12.75	12.75	13.00	9.75
No. 1 cast, Pittsburgh	13.25	13.25	13.75	10.50
No. 1 cast, Philadelphia	12.50	12.50	13.25	10.25
No. 1 cast, Ch'go (net ton)	9.00	9.25	9.50	8.75
No. 1 RR. wrot., Phila.	12.50	12.50	12.50	10.75
No. 1 RR. wrot., Ch'go (net)	8.75	9.00	9.50	6.50

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt	\$3.85	\$3.85	\$3.85	\$1.75
Foundry coke, prompt	4.60	4.60	4.60	2.50

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery†	8.25	8.25	8.25	6.75
Lake copper, New York†	3.62 1/2	3.62 1/2	8.50	7.00
Tin (Straits), New York	53.12 1/2	54.05	55.50	65.87 1/2
Zinc, East St. Louis	4.35	4.35	4.40	3.70
Zinc, New York	4.70	4.70	4.75	4.07
Lead, St. Louis	4.10	4.10	4.10	3.52 1/2
Lead, New York	4.25	4.25	4.25	3.65
Antimony (Asiatic), N. Y.	8.60	8.60	7.95	6.25

▲▲▲ The Iron Age Composite Prices ▲▲▲

Finished Steel

May 15, 1934	2.222c. a Lb.
One week ago	2.222c.
One month ago	2.028c.
One year ago	1.867c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	High	Low
1934	2.222c., April 24	2.028c., Jan. 2
1933	2.036c., Oct. 3	1.867c., April 18
1932	1.977c., Oct. 4	1.926c., Feb. 2
1931	2.037c., Jan. 13	1.945c., Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29
1928	2.286c., Dec. 11	2.217c., July 17
1927	2.402c., Jan. 4	2.212c., Nov. 1

Pig Iron

\$17.90 a Gross Ton
17.90
16.90
14.41

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High	Low
\$17.90, May 1	\$16.90, Jan. 27
16.90, Dec. 5	13.56, Jan. 3
14.81, Jan. 5	13.56, Dec. 6
15.90, Jan. 6	14.79, Dec. 15
18.21, Jan. 7	15.90, Dec. 16
18.71, May 14	18.21, Dec. 17
18.59, Nov. 27	17.04, July 24
19.71, Jan. 4	17.54, Nov. 1

Steel Scrap

\$11.67 a Gross Ton
11.92
12.58
9.83

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

High	Low
\$13.00, Mar. 13	\$11.33, Jan. 2
12.25, Aug. 8	6.75, Jan. 3
8.50, Jan. 12	6.42, July 5
11.33, Jan. 6	8.50, Dec. 29
15.00, Feb. 13	11.25, Dec. 9
17.58, Jan. 29	14.08, Dec. 3
16.50, Dec. 31	13.08, July 2
15.25, Jan. 11	13.08, Nov. 22

Steel Output Up Another Point At Pittsburgh



Local Rate Now 50 Per Cent, While Valley Average Moves Up Two Points to 65 Per Cent—Peak of Production Believed To Be Near

PITTSBURGH, May 15.—Specifications for finished steel products are very insistent from miscellaneous consuming quarters. Continued shrinkage in releases from the automotive industry, however, is making itself felt in certain steel finishing departments. Aggregate volume, nevertheless, is virtually unchanged, and the pressure for shipments is rather severe on most mills.

Although ingot production is gradually catching up with finishing mill schedules, raw steel output in the Pittsburgh district this week is up another point to 50 per cent of capacity. The Wheeling district is holding steadily at 79 per cent. In the Valleys and nearby northern Ohio mills output this week is scheduled at about 65 per cent, an advance of two points over the rate a week ago.

A fair share of current semi-finished steel production is being stocked in anticipation of a rush of specifications in June, so that a tapering off in open-hearth activity is not unlikely within a week or two. Despite reduced schedules at some independent units, tin plate operations are averaging 75 per cent by virtue of heavier schedules at large mills. The local rail mill is staggering production this week on rails and sheet bars. Sheet mills, which are not so much concerned with volume as with the special character of specifications, are maintaining operations at 60 per cent. Strip mills are running at 70 to 75 per cent. Merchant steel bar mills are operating very steadily. Pipe, tube, wire and structural mills, though fairly active, are not keeping pace with other departments.

Steel sheet piling has been reduced \$3 a ton to the former base of 2c. a lb., Pittsburgh. Scrap prices have yielded further ground, with No. 1 steel at Pittsburgh down 50c. a ton to \$12.50 to \$13.

Pig Iron

With roundry melt in this district practically unchanged, shipping releases are sporadic. Next month will probably bring a freer flow of releases, as deliveries against second quarter contracts, most of which were made at lower prices, must be completed by June 30. Inventories early in third

quarter will consequently be rather heavy, as no early expansion in melt is in sight.

Semi-Finished Steel

Deliveries of semi-finished steel to non-integrated mills have practically caught up with consumption. In the case of sheet bars, demand from tin plate mills has slackened notably. On the other hand, sheet mills are pressing for deliveries. Skelp is moving fairly steadily, while wire rods are not particularly active. Some non-integrated tin plate producers are heavily stocked with sheet bars, and may enter third quarter with inventories sufficient to cover three or four months' requirements.

Bolts, Nuts and Rivets

Except for periodic requests from the Navy for requirement bids and a continued fair demand from sources engaged in railroad construction work, this market is quiet. Practically all jobbers and large consumers are under contract for second quarter, and no broad activity is expected until some time next month when third quarter contracting commences.

Warehouse Business

Deliveries out of local warehouses are rather brisk. Current and forward calls for galvanized sheets for rural delivery are particularly encouraging.

Sheet Piling

Effective May 14 the Pittsburgh base for steel sheet piling was reduced \$3 a ton to 2c. per lb. Similar reductions were made effective at Chicago, Buffalo, Gulf ports and Pacific ports. Demand for sheet piling is sustained chiefly by Government dam projects. Bids will be opened this month on the Bonneville, Ore., dam, for which 1000 tons of sheet piling will be specified. A large tonnage also will be needed for the Fort Peck, Mont., dam.

Cold-Finished Steel Bars

Requests for shipments are not so persistent. This is particularly true of automobile manufacturers. Miscellaneous specifications are also lighter. Although there is talk of an advance in price for third quarter, con-

sumers are apparently not anticipating an advance, if the current lagging tendencies in releases against second quarter orders be taken as a gage.

Plates and Shapes

A contract for 50 steel pontoons for the United States Engineer Office, Louisville, has been awarded to Ingalls Iron Works. About 540 tons of plates will be needed for those bottoms. Midland Barge Co. is low bidder on about 200 tons of ½-in. plate to be welded into 20-in. inside diameter pipe for use as dredge pipe for the Government pontoons. Other new barge work is very limited, and current repair work means very little so far as plate tonnage is concerned. Railroad car construction and repairs are the chief factors in current plate consumption.

Fresh specifications for structural steel are generally unimportant, the only sizable job reported last week being for 3300 tons for an approach subway for the Philadelphia-Camden bridge. About 2400 tons for another approach subway to that bridge will be fabricated by the American Bridge Co. at its Ambridge, Pa., plant. Structural awards in the past week were more frequent, but lacked significance from a tonnage standpoint.

Wire Products

The recent rush of shipments against pre-advance orders appears to be abating. Motor car manufacturers are decreasing their takings of wire. The movement to jobbers is fairly heavy, and the merchant trade is expected to be substantially stocked at the turn of the quarter. Some mills are maintaining recent high production schedules, while others have already begun to revise schedules in keeping with reduced specifications.

Tubular Products

Specifications for oil country goods and standard pipe on second quarter contracts made prior to the recent changes in discounts continue to improve. The betterment does not apply to line pipe, which is particularly depressed by financial legislation now under way at Washington. Demand for mechanical tubing is lighter as a result of reduced specifications from the automotive industry.

Sheets

Despite a definite shrinkage in specifications from the automotive industry, aggregate volume of shipping releases continues to be fairly heavy. Producers still are somewhat concerned over rolling problems that are expected to accompany heavy pressure for shipments next month. In anticipation of these difficulties, it is believed likely that most producers will necessarily soon establish a final date for the placing of releases in order to meet the code deadline for shipment on June 30 with the least strain on operating departments. Op-

erations this week will probably hold at the recent rate of 60 per cent. It is doubtful whether production will average much higher than that at any time during the remainder of the quarter, unless the recession in automotive specifications be arrested.

Tin Plate

Although some independent mills have slowed production, continued high operations at leading producing units are sustaining average production at nearly 75 per cent. Fresh specifications are not being received so rapidly as in recent weeks, and producers are pretty heavily stocked with tin plate in anticipation of seasonal specifications from the can makers this summer. Reports from drought-stricken areas are undoubtedly a retarding influence on specifications.

Strip Steel

Based on the recent rate of specifications, most mills this week are scheduling output at about 70 to 75 per cent of capacity. Sudden revisions of rolling schedules are not unlikely, as specifications from the automotive industry may be sharply reduced before another fortnight. The general run of releases, however, is encouraging, and second quarter backlogs of miscellaneous tonnage, if ordered out in full before the close of the quarter, will undoubtedly place heavy pressure upon producers next month to make delivery by the deadline.

Coal and Coke

Fresh demand for bituminous coal and furnace and foundry coke is very light. Practically all important consumers are under contract, and spot business has been disappointing. Demand for foundry coke particularly has been below expectations this month. General consumption of fuel in the second quarter has been fairly heavy. Production of bituminous coal in the Pittsburgh district is around 80 to 85 per cent of normal output. Production for the next several months is expected to be maintained at the present rate. Shipments of bituminous coal to Lake ports are probably the most important factor sustaining current production.

Bars

Although specifications from the automotive industry are beginning to lessen, general releases against second quarter contracts still are considered very satisfactory. The movement to nut and bolt manufacturers and forging shops is holding up very well. Although it is difficult to determine what percentage of second quarter shipments is going directly into consumption, it is conceded that a fair share of deliveries is building up consumers' stocks.

The usual amount of Federal, State and municipal work is coming out from week to week to maintain a fair

demand for billet steel reinforcing. Projected dam construction in the Northwest offers the largest prospective outlet at the moment.

Scrap

A veritable buyers' strike has forced some grades to nominally lower levels. Although some dealers have tried to induce purchases by reducing prices, no significant buying has been attempted, at least during the past seven-day period. Some dealer offerings of No. 1 heavy melting steel have dipped as low as \$12.50. Most sellers, however, are not inclined to budge from \$13. Hence, No. 1 steel is nominally quotable this week at a

range of \$12.50 to \$13. Whether or not prices would rebound on a major turnover is conjectural. Scrap is plentiful, and is particularly abundant from the automobile producing centers. Most consumers, moreover, are evidently restricting consumption to scrap against second quarter orders, and at the moment no further important buying is in sight. The relatively high rate of ingot production in the Pittsburgh district is taking its toll of scrap piles, but the uncertainty of third quarter prospects is undoubtedly deferring some buying against latent requirements. Railroad specialties are slightly lower on a recent sale.

Sustained Operations in Valleys Assured Until Middle of June

YOUNGSTOWN, May 15.—Second quarter specifications for most steel products are running 60 to 70 per cent ahead of those in the same period last year. Consumers still are ordering out shipments very freely on soft steel bar, sheet and strip contracts, and to a lesser degree on plate, shapes and tin plate orders. Calls for pipe are relatively unimportant, except for a slight spurt in contracting for standard pipe prior to the lowering of discounts. A contraction in acceptances of bars, sheets and strip by the automotive industry is apparent, though not unexpected in the face of tapering production in that quarter.

Miscellaneous consumers, however, are evidently building up steel stocks and are taking shipments on schedule or even in anticipation of June requirements. Hence the lag caused by lessened demand from the motor car industry is being largely offset. At least, there is no evidence of an early, drastic slump in general specifications.

The demand for certain special items of finished sheets has been so pressing that some producers are booked to capacity and are not able to accept any additional second quarter tonnage. Perhaps the threat of a strike toward the close of the quarter is a factor that is not being overlooked by steel consumers at this time.

Tin plate operations in the Valleys have fallen off with reduced specifications, which possibly are being pared down in consequence of reports of droughts in the Middle West. There are yet no definite indications that early fruit or vegetable crops will be seriously curtailed by the current dry spell, but nevertheless it is apparently exerting a dampening influence on tin plate specifications.

Raw steel production, in some cases, is running ahead of finishing mill schedules. There is evidence of ac-

cumulating of semi-finished steel at some finishing units. This stocking is conceded to be expedient if current expectations of heavy last-minute pressure for shipments in June are fulfilled. In the current week, 57 of a total of 83 open-hearth are scheduled to be on. Bessemer capacity is being utilized intermittently. A sharp drop in ingot output is not looked for until toward the middle of June. Further recessions on July 1 may be expected. But some hope for a moderate slump is held out by the fact that tonnages of railroad fastenings in most instances do not have to be shipped until Aug. 31. Shipments of structural material on identified projects also may help to mitigate the summer lull.

Foundry melt in this district has improved, but not to a point where stock piles of pig iron are being noticeably reduced. Most foundries contracted for second quarter tonnage, at pre-advance prices, in excess of their normal needs. Little doubt exists that all second quarter contracts will be fully specified, and producers expect June to be a banner month for pig iron shipments. As a result, third quarter will probably be very lean from a standpoint of fresh tonnage.

Scrap values in the Valleys have not escaped the weakness prevailing in other districts. No major purchases of scrap have been reported since the buying movement late in the first quarter. Price adjustments have therefore been largely nominal. Prevailing quotations represent the bases at which some dealers would be willing to sell. No. 1 heavy melting steel is apparently plentiful at \$12.75 to \$13, while distress tonnage has been offered at below these figures. Hydraulic bundled sheets are likewise weak. Most consumers covered amply for second quarter, and unless scrap prices sag to bargain levels, there is little likelihood of any important buying during the current quarter.

Pipe Line and Railroad Orders Feature Chicago Market



Milwaukee Fabricator Books 11,000 Tons of Pipe—Western Roads Place 500 Cars and 25,000 Tons of Rails—Production Sustained

CHICAGO, May 15.—A few cross trends are now noticeable in the local iron and steel market. The scrap market remains weak in spite of heavy melt, which is at the peak for the year. Some recession in general demand from automobile manufacturers is at hand, but farm implement manufacturers are pushing their programs and road machinery builders are expanding their needs for steel. Although some local rains have fallen, on the whole the Middle West and the near Northwest are still seriously handicapped by drought conditions. Another disturbing factor is the strike epidemic which is now reaching into the major industries in this area.

Steel mill output is steady at 64 per cent of capacity. However, underlying this figure are conditions that point to more than an interruption of the steady climb of production. For the first time in weeks some plants have dropped output three to four points. Others report steady production, while in one case output has been raised. In the case of the advance in production heavier demand for sheets and strips has brought about the change.

The Chicago Great Western has ordered 500 steel box cars. The material required will reach mills at a time when the construction industry seems to be headed for a nose dive. Private projects are almost negligible and public works have quite evidently passed the spring peak. An order for 11,000 tons of steel pipe gives much needed help to plate mills that have been producing far below the average of other finishing units.

Pig Iron

There is no check to the rate at which pig iron is moving. The May rate of shipments being fully 20 per cent heavier than in the preceding month. The melt in some automobile foundries is, however, lower. Both charcoal and Southern irons are keeping pace in their relative fields with the movement of the Northern product.

Cast Iron Pipe

Chicago's inquiry for 1100 tons of 12 and 16-in. cast iron pipe is the one outstanding event in this market. Springfield, Ill., is in the market for

some valves. In general, the market is very quiet. Sellers are at a loss to explain not only the slowness of releases against old PWA work, but also the inactivity on similar projects which have been considered for a long time but on which prices have not been taken.

Reinforcing Bars

Higher price schedules have served to drive in some old tonnages which are now added to distributors' books. Fresh inquiries are very sluggish, as "pump priming" by Government funds lags and private initiative fails to take hold in any marked degree. Distributors, because of orders on books and pending public work, look for fair business for about two months, but, in view of the lack of tonnage inquiries, are skeptical of how they will fare beyond that time.

Rails and Track Supplies

The Union Pacific has ordered 25,000 tons of rails, 10,000 tons having been taken by the Colorado mill, 10,000 tons by Illinois Steel and 5000 tons by Inland. Sellers believe that orders from now on will be light, the only large tonnage looked for being that of the Chesapeake & Ohio. Rail mills are holding to 40 per cent of capacity and accessory departments have been speeded up to match the rate of rail shipments. Immediate requirements in track supplies have been covered by the railroads and as a consequence new business is at a very low point.

Structural Material

Releases during the past week have been steady, and the upward swing noted in recent weeks has been checked. Whether or not this is only a temporary condition cannot be gaged at this time. Much Government sponsored work is still to be heard from. On the other hand, private projects are extremely scarce and the outlook is not promising. Current awards are light and fresh inquiries are in such small total volume as to lend little encouragement to fabricators. It is particularly noticeable that State highway bridge work lacks the snap that it had earlier in the month.

Plates

The one big development in this market is an order placed by the Chicago Great Western with the Pullman Car & Mfg. Corp. for 500 steel box cars. It is expected that the necessary materials will be allotted before the end of this month. Mills report more active demand for car materials. Some of this business comes from builders who are engaged on the Van Sweringen cars and part comes from the Milwaukee Road and the Illinois Central, both of which have heavier shop schedules. Pipe line and oil tank work remains dormant.

Wire Products

Shipments remain steady, but the trade is beginning to sense that a quiet summer lies ahead. The drought in the Middle West and the Northwest is still a very disturbing factor and labor troubles are undiminished. A very moderate gain in consumption of wire rope is recorded in spite of the handicaps of petroleum control and general slackness in the building industry.

Demand for copper wire can be classed only as moderate. Although the Government is in the market for quantities of copper wire this business is not entirely to the liking of sellers for the reason, it is understood, that only 10 per cent above cost will be allowed.

Cold-Rolled Strips

Backlogs are heavy and shipments are near capacity on the basis of the character of releases, which call for wide variations in widths and gages. Specifications from automobile builders are lower for the reason that some of the new ultra-modern models call for sheets rather than strips.

Sheets

If Chicago producers' shipments are an accurate gage, then the peak rush of automobile manufacturing is over. However, releases from all other sources are steady and local mills are engaged near capacity.

Bars

In all lines excepting automobiles the demand for bars is holding well. Road machinery builders are increasing schedules and so far farm implement manufacturers have not lowered output. Reinforcing bars are in good demand. All told, the bar market seems to have a good footing for the remainder of this quarter.

Scrap

Tendencies in this market are mixed. Easier prices in the East are being watched closely by local sellers, who are disturbed by the persistency with which local mills refrain from coming into the market. Dealers are paying less for needed tonnages and railroad offerings have established new low prices for the grades offered. The Milwaukee Road has sold 8000 tons, and the Burlington sold heavy melting steel at \$11.25 a gross ton, delivered.

Steel Releases Recede In New York District



General Labor Unrest Checks Consumers' Desire to Build Up Inventories—Proposed Abolition of Grace Period on Prices Opposed

NEW YORK, May 15.—Steel specifications are receding rather than increasing notwithstanding the threat of a steel strike. Buyers no longer seem so anxious to build up stocks, even at the marked savings afforded by taking steel placed at the prices which prevailed before recent advances. In many cases consumers have labor troubles of their own and are consequently cautious about piling up inventories that they may not be able to use.

The principal effect of the strike move of the Amalgamated association is to supply fresh support to tin mill operations. Makers of tin plate are again accumulating stocks against a possible interruption of operations, realizing that the needs of the trade must be supplied without delay since packs of vegetables and fruits must be handled when they are ready for canning.

The only lines in which the pressure of demand may prove embarrassing to the mills before June 30 are sheets and possibly strips. At least one interest closed its books for June specifications on sheets today.

A new unit of the Rockefeller Center group of buildings in this city will soon come out for bids. It will be a 48-story structure requiring 10,000 tons of structural steel. American Bridge Co. has booked 240 tons for approaches to the Tri-borough bridge, and bids are to be taken within the next 60 days on the main span calling for 11,000 tons of steel.

General Johnson has retracted his recent statement to the effect that changes in the steel code will be "slight." Among the most recent intimations from Washington is that the 10-day waiting period after the announcement of price changes will be abolished. Such an amendment would not be of great importance during a period of rising prices and, in fact, under the code 10 days' notice is not required in the case of advances, but it would undoubtedly be unwelcome to the industry so far as reductions are concerned. If mills are permitted to make cuts in prices without notice, there is nothing to prevent a return of competition of the "chiseling" type. Sharp concessions to large buyers could be made by the simple device of filing a re-

duction with the institute and then immediately withdrawing it. In fact, the abolition of the grace period would work to the advantage of large buyers instead of the smaller buyers, which Washington authorities profess to be so anxious to protect.

Pig Iron

Melting schedules in this territory are practically unaltered, but all sellers are asking for releases on recently made contracts with the result that May quotas will probably be fairly well shipped out. Nevertheless, it is expected that considerable contract tonnage will lag until late June and thereby result in a sizable consumer carry-over for the third quarter. About 100 tons of foundry iron was sold last week and sales of specialty grades totaled 425 tons, against 425 tons in the preceding period, and 1700 tons booked a fortnight ago. There is no open inquiry in this market, and sellers have no expectations of any important business appearing.

Reinforcing Steel

The flow of small tonnages is in much lower volume, fewer large jobs are pending and the market continues quiet. Concrete Steel Co. will furnish 300 tons of bars for a Newark, N. Y., school building, and Truscon Steel Co. was awarded 125 tons for Tri-Borough Bridge approaches. There have been several highway awards in Massachusetts, and a bridge in New Jersey to Kalman Steel Corp. accounted for an additional 135 tons.

Cast Iron Pipe

The market was somewhat soft early in the month but current quotations are firm at \$46 and \$43 a ton for 4-in., and 6-in. and larger delivered New York. Inquiry is very light in the present market, and actual orders seldom involve even moderate tonnages. Pending tonnage awards include about 1500 tons of 2-in. and larger for installations at Orangeburg, Oswego, Coxsackie, and Danemora, N. Y.

Scrap

All active grades are definitely down. Current brokers' prices here will probably hold steady at the lower levels throughout the week despite

continued softness in outside selling markets. Practically all domestic contracts have been shipped, but mills are still refusing to consider new commitments. Nevertheless foreign melters continue to be anxious for steel, and several sizable contracts were placed last week at prices substantially the same as in previous weeks. About 600 tons of stove plate and cast grades are now being loaded for England, and 1000 tons of rails have been loaded for Japan at a very attractive selling figure. Brokers are now paying \$7.50 and \$6 for No. 1 and No. 2 heavy melting steel on barge for shipment to Italy, Poland, and Japan, and moderate quantities of steel are being loaded at Jersey points for Coatesville and Vandergrift, Pa., consumers. After purchasing heavily at the higher prices of a month ago, Bethlehem is now limiting its direct transactions to occasional small tonnages.

Shipments Still Heavy At Cincinnati

CINCINNATI, May 15.—Pig iron demand is limited to a few spot orders from small users. Most melters are covered for this quarter and some of them will carry fair-sized inventories into the third quarter. Shipments against contract are at a good rate, indicating the desire of purchasers to accept all iron under contract. Foundry melt is diminishing, although stove melters report fairly brisk operations.

Coke

Birmingham ovens have returned to the market with foundry quotations at \$9.05 delivered in Cincinnati. These ovens had suspended new business temporarily to await the outcome of code authority orders increasing wage costs. New coke business is negligible, although shipments continue to be good.

Steel

Steady improvement in stove demand for sheets has offset slackness in other lines, sustaining mill operations at about 60 per cent of capacity. Automotive demand is weakening, although manufacturers are specifying at fair rates against contract. Jobbers are taking more steel, especially galvanized sheets, mill bookings of which are at 100 per cent of capacity. This spurt is largely due to a desire to escape the recent price increase on galvanized sheets. Despite open weather, there is no evidence of new construction demand for steel.

Scrap

The market is tending weaker. Dealers' bids, while unchanged, are still nominal, scrap being worth whatever the trader can obtain. Speculative buying also is nil, but shipments are steady.

Demand Off, Production Up, at Cleveland



Specifications from Motor Car Industry Decline — Steel Ingot Output Up Two Points to 67 Per Cent — Scrap Recedes

CLEVELAND, May 15. — Steel specifications from the motor car industry have declined with the tapering of production by some of the leading automobile manufacturers, who evidently are scaling down their releases in keeping with their reduced June schedules. In spite of this curtailment in demand, ingot output in the Cleveland-Lorain territory was stepped up two points this week to 67 per cent of capacity, one open-hearth furnace in Lorain being put on.

Some of the automobile manufacturers apparently expected that their high rate of production would be maintained through June and placed second quarter contracts for larger tonnages, particularly in sheets, than they will require based on their reduction in schedules. As a result some of the steel that was intended for June production will be allowed to lapse or be placed in stock. With higher prices prevailing on steel shipped after June 30, it is not expected that much second quarter tonnage will be canceled. New Chevrolet releases for 40,000 automobiles covering part of its June schedules are expected this week.

Demand for finished steel continues very satisfactory from industries outside of the automotive field. Consumers of most products are ordering their monthly quotas against contracts. While some of the sheet and strip mills may become congested with orders in June, it is not expected that mills will have trouble in delivering other products covered by second quarter contracts, provided they receive specifications in reasonable time.

With scrap consumers holding up shipments and liquidating stocks, prices have declined sharply.

Pig Iron

Shipping orders have slowed down following a spurt early in the month. However, the tonnage shipped in May is expected to exceed that of April. The decline in shipping orders is mostly from jobbing foundries making automotive castings. Foundries operated by the motor car companies and those not in the automobile field continue to take iron at the recent rate.

Iron Ore

Ore prices for the season are not yet definitely settled but probably will be established this week with no change from last year. The season of navigation opened with a reduction of over 2,250,000 tons in ore stocks. On May 1 furnace stocks amounted to 22,009,996 tons, and furnace and dock stocks were 26,580,622 tons as against 28,847,977 tons on the same date a year ago. Ore consumed in April was 2,470,121 tons, as compared with 2,189,966 tons in March and with 771,972 tons in April last year. On May 1 there were 97 furnaces in blast using Lake ore, an increase of 12 for the month.

Bars, Plates and Shapes

The Erie railroad has placed local grade crossing elimination work requiring 270 tons of structural steel and has inquiries out for two similar projects in western New York, requiring 1030 tons. An Ohio State highway bridge will require 150 tons. The Variety Iron Works Co., Cleveland, has taken a contract for equipment for a prison at Auburn, N. Y., requiring 1400 tons in bars, plates and small shapes. There is little new demand for reinforcing bars. Orders for merchant bars against contracts continue good. Specifications for plates and shapes are rather light.

Warehouse Business

Cleveland jobbers have advanced prices \$8 a ton on hot-rolled annealed and on galvanized sheets. These light-gage sheets were not marked up when warehouse prices were advanced on other grades recently.

Strip Steel

Specifications for both hot and cold-rolled strip from the motor car industry fell off the past week. Some of the leading parts manufacturers that had been taking good tonnages have reduced their schedules. Demand from other sources continues fair. No business is being placed at the new prices.

Sheets

With automobile production schedules reduced, releases from the motor

car manufacturers show quite a decline and specifications also have fallen off from the stamping plants in this territory that make automobile parts. Demand from the refrigerator industry and other consumers is being well maintained. While tonnage is not coming out in sufficient volume to permit full operations, some mills are taxed to their full capacity through June in wide full-finished sheets.

Scrap

Prices have declined 75c. a ton on steel-making scrap and 50c. a ton on blast furnace grades. These reductions reflect not only an inactive market but the holding up or restriction of shipments by Cleveland and Youngstown district mills. While consumption is being maintained at the recent rate, consumers are reducing their scrap inventories, evidently being influenced in doing this by uncertainty regarding operations during the third quarter.

New Dam Project Is Feature on Coast

SAN FRANCISCO, May 14.—Sales have slackened noticeably, although production continues to hold up. Structural steel awards have gained, while reinforcing bars have shown less activity. Business in tubular goods continues in larger volume than in the first quarter. Scrap purchases for domestic consumption have not lessened, and scrap is bringing from \$7.50 to \$9 a gross ton from foreign buyers. Ingot production is holding steady.

Plans for the Parker dam unit of the Colorado River project are being completed and bids will be taken at Denver by the Bureau of Reclamation about July 1. This \$13,000,000 dam, to be located 145 miles below Boulder dam, will require approximately 2000 tons of structural steel, 1000 tons of reinforcing bars and 500 tons of plates. At Los Angeles, approved plans for the construction of the main line of the municipal railway terminal call for 1914 tons of rails.

Outstanding among the awards for the week was the booking by Commercial Shearing & Stamping Co. of 2300 tons of structural steel for tunnel ribs and 2500 tons of tunnel liner plates for the Metropolitan Water District at Los Angeles. McClintic-Marshall Corp. also took 600 tons of shapes for tunnel supports on the same project. Thompson Mfg. Co. booked 1250 tons of plates for a pipe line at Monte Vista, Colo. Lettings for the week aggregated 4861 tons of structural steel, 943 tons of reinforcing bars and 3750 tons of plates. New projects totaled 2903 tons of structural steel, 1627 tons of reinforcing bars and 1283 tons of plates.

Railroad Tonnage Supports Eastern Pennsylvania Market



Reading Orders 10,000 Tons of Rails and Pennsylvania Releases Large Tonnage of Track Accessories—General Business Dull

PHILADELPHIA, May 15.—Railroad business is again the outstanding feature of this market which otherwise has been unusually dull during the last week. The Reading has placed 10,000 tons of rails, 8000 tons going to the Bethlehem Steel Co. and 2000 tons to the Carnegie Steel Co. Track accessories to accompany this purchase will be placed later as laying of the rails is not contemplated before late summer or fall. This railroad is also ordering plates and shapes regularly for car repairs and the program will last through the summer.

The Pennsylvania has released 25 per cent of the track accessories which it ordered last December. The purchase amounted to between 35,000 and 40,000 tons, all of which will have to be shipped by Aug. 31 under the terms of the code. Most of the steel for the Pennsylvania's car building program has been specified, but shipments will continue for several weeks. Fabricating shops are working on the transmission towers for this railroad's electrification program.

Settlement of the strike at the Camden, N. J., plant of the New York Shipbuilding Co. has resulted in resumption of shipments to this point. Other shipyards in the district are fairly busy. Bids are being asked on the third and last section of the high-speed subway approach to the Philadelphia-Camden bridge which will require about 5000 tons of shapes, bars and piling. The Belmont Iron Works has been awarded 2250 tons of structural steel for a Government flying field at Middletown, Pa.

Steel ingot production in the Philadelphia district is holding its own at about 46 per cent of capacity. One independent plant has curtailed output slightly, but the leading interest is maintaining its schedules. Finishing mill activity has not changed materially. Rail production is being sustained at a fair rate and sheet and tin plate mills are especially busy.

Pig Iron

The market is unusually quiet with no new buying of consequence reported. Consumers are taking shipments at a fair rate, but seem to be in no hurry to order out tonnage con-

tracted for at the old prices. Cast iron pipe foundries have not increased their operations, but most of the orders they are working on are PWA projects on which domestic iron must be used.

Steel Imports

The following iron and steel imports were received here last week: 6600 tons of iron ore from Algeria, 773 tons of pig iron from British India and 100 tons of ferromanganese from England.

Bars, Plates and Shapes

Bids will be taken June 1 on section 3 of the high-speed approach to the Philadelphia-Camden bridge which will require 3200 tons of shapes, 1000 tons of piling and 800 tons of reinforcing bars. The Pennsylvania Railroad is preparing plans for a job in connection with its Thirtieth Street station at Philadelphia which will take several hundred tons of shapes. Structural steel for the Government flying field at Middletown, Pa., will be fabricated by the Belmont Iron Works. Except for these jobs the market on structural shapes and reinforcing bars is rather quiet with tonnage confined to small jobs. Movement of plates to shipbuilders in the district has increased following the settlement of a strike in a large plant. Shipments to the railroads for car building and repair work are well sustained.

Sheets

Scarcely any business is being booked and mills are meeting with some opposition in securing specifications against contracts already written. Producers in the Middle West are reported to be filled up for the remainder of the quarter on some finishes and sizes of sheets but eastern sellers are able to accommodate tonnage for rolling during the greater part of June. The new prices have not been tested.

Warehouse Business

Sales out of warehouse in this territory during May compare favorably with the corresponding April period, but no improvement is reported. Higher prices are now being quoted

generally, but little business is being done to test them.

Scrap

Consumers are displaying no interest in further purchases and the market is sentimentally weaker. Dealers are having no difficulty buying heavy melting steel against recent orders for \$11 and less and the No. 2 grade is quotably lower. Railroad specialties are lower and the cast grades lack strength. Buying for export constitutes the principal activity in this market and lower quotations would undoubtedly appear if it were not for this outlet.

New Steels to Be Used In New England Cars

FIFTY streamlined through-service passenger coaches recently ordered by the New York, New Haven & Hartford from the Pullman-Bradley Car Corp. and to be constructed at Worcester, Mass., will be built of USS Cor-Ten and Man-Ten high-tensile steels manufactured by the United States Steel Corp. The New Haven cars, as the result of the use of these steels, will weigh 100,000 lb. each, which compares with a weight of 135,000 lb. for standard-design cars constructed of carbon steel.

The Pullman-Bradley company has also received a contract for 21 suburban passenger coaches from the Boston & Maine. It is expected that these cars will also be built at Worcester, in which case they will be constructed of USS Cor-Ten and Man-Ten steels.

"Emergency" Work in Plants Defined

WASHINGTON, May 15.—The NRA has ruled that installation of new equipment and the dismantling of machinery for transfer to other departments of plants are not "emergency work" as defined under a number of codes.

The ruling was in connection with a request by the code authority of the paperboard industry for a definition of "emergency work" within the meaning of a proviso in the code for that industry, which lifts the limitation on hours of work from "employees of any class when engaged in emergency repairs or emergency maintenance work involving breakdowns or protection of life or property."

It was held, however, that the repairing of breakdowns is emergency work. The importance of these interpretations is due to the fact that many other approved codes contained similar "emergency work" provisos.

Further Drop in Output At Buffalo

BUFFALO, May 15.—Steel output has receded further with the removal of two additional Republic open-hearths from the active list. The Lackawanna plant of Bethlehem Steel Corp. continues to operate 16 and the Seneca sheet division of Bethlehem is operating at 90 per cent of capacity.

Some interest is being stirred locally among structural steel fabricators by the announcement of plans soon to come out for a new Kensington high school. Between 75 and 100 tons of reinforcing bars for a plant for the New Process Co., Warren, Pa., was awarded to a Buffalo fabricator.

Pig iron buying has dropped to a minimum, with no sizable inquiries out and most transactions limited to carload lots. Operations remain as before.

The scrap market is soft and few transactions were consummated during the week. It is understood that small lots of machine shop turnings were sold for \$5.50 and some short mixed borings and turnings for \$9, Niagara Falls. Few buyers are interested in the market and at least two mills are receiving fairly heavy shipments of old material by barge and Lake boat. Practically every consumer that bought during the past six weeks is now restricting shipments.

Specifications Slowing Up in South

BIRMINGHAM, May 15.—New steel tonnage has tapered off, but there is a satisfactory volume on the books for this quarter. Both manufacturers of steel in this district report that specifications are slowing up and that many buyers are putting off as long as possible the ordering of their monthly quotas. Some will probably lose them.

Sixteen open-hearths were operated the early part of last week, and 15 the latter part. The schedule this week calls for 15.

The pig iron market is coasting for the time being, with current requirements already covered. A little new tonnage is picked up from time to time, but the aggregate is not large. May shipments have shown improvement as compared with April, and this increase is likely to be maintained through the month. The furnace situation is unchanged, with ten stacks in blast.

The ore mine strike, which was called May 4, is still in progress and all production is stopped. No plans have been made yet by the companies for resumption. They all have ample stocks on hand for the next several weeks. The National Guard was called

out last week to preserve order at several of the mines.

New pipe tonnage for May is about the same as for April. Last week Oakland, Cal., awarded and released about 2000 tons. This was divided between American Cast Iron Pipe Co. and United States Pipe & Foundry Co. The latter company also received about 240 tons from Mare Island, Cal.

Canadian Steel Output At 60 Per Cent

TORONTO, ONT., May 15.—The automotive and mining industries continue the largest buyers of steel and equipment. Sales on export account are improving, and it is expected that rail and rolling stock contracts soon will be awarded by the Canadian railroads. Mills are maintaining operating schedules of between 40 and 60 per cent, while foundries are running at an average rate of approximately 38 per cent.

Demand for merchant pig iron is holding around 500 to 600 tons per week. Production is holding around 650 tons per day with two furnaces blowing, one at Sault Ste. Marie, Ont., and the other at Sydney, N. S. It is expected that the Steel Co. of Canada, Hamilton, soon will blow in a stack. Pig iron prices are firm and unchanged.

Trading in scrap continues specialized. Mills are out of the market, and demand for steel scrap is practically at a standstill. It is stated that large tonnage shipments of heavy melting steel and turnings will be made to Britain with the opening of St. Lawrence navigation and a number of contracts already have been closed. Cast scrap continues to be the most active grade, with supplies light and dealers importing from the United States. Prices are unchanged.

St. Louis District Still Active

ST. LOUIS, May 15.—Specifications against contracts for wire products, sheets and tin plate are reported very heavy, reflecting the desire of purchasers to get shipments before the end of the second quarter. Releases of structural steel are only fair, although there has been an increase in inquiries for small private projects. The award of 450 tons of reinforcing bars for the third unit of the municipal Negro hospital has been made to Joseph T. Ryerson & Son, Inc.

Stove foundries here and in Belleville are working at full capacity, with the largest volume of spring business on their books they have enjoyed in years. The plants are

striving to clean up their order files before June 18, when a 10 per cent wage advance becomes effective. Demand from mail order houses has been extremely heavy. Specialty foundries catering to the automobile and home appliance fields also are extremely busy. All of these influences have made for a heavy melt of pig iron. While there is a lull in pig iron buying, and none of consequence is expected for the remainder of the second quarter, shipments have been heavy.

In the scrap market an East Side melter bought 4000 tons of No. 2 heavy melting steel at \$8 a ton. Otherwise, trade has been light, with no new mill buying in sight. Steel producers seem well fortified with scrap for the summer and look for lower prices. Outside offerings continue heavy. Nos. 1 and 2 heavy melting steel and No. 2 railroad wrought are 50c. a ton lower, and steel angle bars are off 75c. a ton. Railroad lists: New York, Chicago & St. Louis, 1600 tons; Chicago, Milwaukee, St. Paul & Pacific, 185 carloads.

New Commercial Resolutions

ON May 10 the board of directors of the Steel Code adopted commercial resolution No. 59, relating to sales of less than carload quantities of steel fence posts, and amended commercial resolution No. 44, covering freight allowances on sales to the Federal Government.

Resolution No. 59 permits makers of steel fence posts (other than those made of welded steel pipe) to charge no more than the carload freight rate on less-than-carload shipments. Permission to deduct the difference between less-than-carload and carload rates was granted to put manufacturers of posts who do not make wire products on the same footing as those who customarily ship wire fencing and other wire products in mixed carloads with fence posts, thereby getting the benefit of carload freight rates.

Resolution No. 44 originally allowed sellers to departments and divisions of the Federal Government to deduct from the delivered prices on iron and steel the railroad freight rate from plant to place of delivery. This was necessary because the Government enjoys preferential freight rates on land grant railroads. In other words, the resolution gave title to the Government department at the steel company's plant at an f.o.b. mill price.

The resolution as modified authorizes a reduction from the f.o.b. mill price of the amount by which the lowest railroad freight rate from any other member of the code exceeds the lowest freight rate from the plant of the seller to the place of delivery.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars	
Soft Steel	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago or Gary	1.95c.
Del'd Philadelphia	2.10c.
Del'd New York	2.25c.
F.o.b. Cleveland	1.95c.
Del'd Detroit	2.05c.
F.o.b. Buffalo	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Pacific ports	2.45c.
F.o.b. cars dock Gulf ports	2.30c.

Rail Steel	
(For merchant trade)	
F.o.b. Cleveland	1.85c.
F.o.b. Chicago	1.85c.
F.o.b. Gary	1.85c.
F.o.b. Pittsburgh	1.80c.
F.o.b. Buffalo	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. cars dock Pacific ports	2.20c.
F.o.b. cars dock Gulf ports	2.35c.

Billet Steel Reinforcing	
(Cut lengths as quoted by distributors)	
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
F.o.b. Birmingham	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. Cleveland	2.10c.
Del'd Detroit	2.20c.
F.o.b. Youngstown	2.10c.
F.o.b. cars dock Pacific ports	2.60c.
F.o.b. cars dock Gulf ports	2.45c.

Rail Steel Reinforcing	
(Cut lengths as quoted by distributors)	
F.o.b. Pittsburgh	1.90c.
F.o.b. Cleveland	1.95c.
F.o.b. Youngstown	1.95c.
F.o.b. Gary	1.95c.
F.o.b. Chicago	1.95c.
F.o.b. Buffalo	1.95c.
F.o.b. Birmingham	1.95c.

Iron	
Common iron, f.o.b. Terre Haute, Ind.	1.75c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Phila.	1.85c.
Common iron, del'd N. Y.	1.95c.

Steel Car Axles	
F.o.b. Pittsburgh	2.65c.
F.o.b. Chicago	2.65c.
F.o.b. Birmingham	2.65c.

Tank Plates	
Base per Lb.	
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Gary	1.90c.
F.o.b. Birmingham	1.90c.
Del'd Cleveland	2.00c.
Del'd Philadelphia	2.03c.
F.o.b. Coatesville	1.95c.
F.o.b. Sparrows Point	1.95c.
Del'd New York	2.13c.
F.o.b. cars dock Pacific ports	2.40c.
F.o.b. cars dock Gulf ports	2.25c.
Wrought iron plates, f.o.b. P'gh.	3.00c.

Floor Plates	
F.o.b. Pittsburgh	3.35c.
F.o.b. Chicago	3.40c.
F.o.b. Coatesville	3.45c.
F.o.b. cars dock Gulf ports	3.75c.
F.o.b. cars dock Pacific ports	3.90c.

Structural Shapes	
Base per Lb.	
F.o.b. Pittsburgh	1.85c.
F.o.b. Chicago	1.90c.
F.o.b. Birmingham	1.90c.
F.o.b. Buffalo	1.95c.
F.o.b. Bethlehem	1.95c.
Del'd Cleveland	2.03c.
Del'd Philadelphia	2.05c.
Del'd New York	2.10c.
F.o.b. cars dock Gulf ports	2.25c.
F.o.b. cars dock Pacific ports (standard)	2.40c.

Steel Sheet Piling	
Base per Lb.	
F.o.b. Pittsburgh	2.00c.
F.o.b. Chicago	2.10c.
F.o.b. Buffalo	2.10c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Alloy Steel Bars	
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.	2.55c. a lb.
Open-hearth grade, base.	2.70c.
Delivered price at Detroit is 2.70c.	
Series	
Numbers	Differential per 100 lb.
2000 (1/4% Nickel)	0.25
2100 (2 1/4% Nickel)	0.55
2300 (3 1/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.45
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4400 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.85
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Cold Finished Bars and Shafting*	
Base per Lb.	
Pittsburgh	2.10c.
Chicago	2.15c.
Cleveland	2.15c.
Buffalo	2.20c.
Detroit	2.30c.
Eastern Michigan	2.35c.

* In quantities of 10,000 to 19,000 lb.

SHEETS, STRIP, TIN PLATE

TERNE PLATE	
Sheets	
Hot Rolled	
Base per Lb.	
No. 10, f.o.b. Pittsburgh	2.00c.
No. 10, f.o.b. Gary	2.10c.
No. 10, del'd Detroit	2.20c.
No. 10, del'd Phila.	2.20c.
No. 10, f.o.b. Birmingham	2.15c.
No. 10, f.o.b. dock cars Pacific ports	2.55c.

Hot-Rolled Annealed	
No. 24, f.o.b. Pittsburgh	2.65c.
No. 24, f.o.b. Gary	2.75c.
No. 24, del'd Detroit	2.85c.
No. 24, del'd Phila.	2.90c.
No. 24, f.o.b. Birmingham	2.80c.
No. 24, f.o.b. dock cars Pacific ports	3.25c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled	
No. 10 gage, f.o.b. Pittsburgh	2.55c.
No. 10 gage, f.o.b. Gary	2.65c.
No. 10 gage, del'd Detroit	2.75c.
No. 10 gage, del'd Phila.	2.84c.
No. 10 gage, f.o.b. dock cars Pacific ports	3.25c.

Light Cold-Rolled	
No. 20 gage, f.o.b. Pittsburgh	3.15c.
No. 20 gage, f.o.b. Gary	3.25c.
No. 20 gage, del'd Detroit	3.35c.
No. 20 gage, del'd Phila.	3.44c.
No. 20 gage, f.o.b. dock cars Pacific ports	3.70c.

Galvanized Sheets	
No. 24, f.o.b. Pittsburgh	3.25c.
No. 24, f.o.b. Gary	3.35c.
No. 24, del'd Phila.	3.54c.
No. 24, f.o.b. Birmingham	3.40c.
No. 24, f.o.b. dock cars Pacific ports	3.85c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes	
No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.65c.
Vitreous Enameling Stock	
No. 20, f.o.b. Pittsburgh	3.20c.

Tin Mill Black Plate	
No. 28, f.o.b. Pittsburgh	2.85c.
No. 28, Gary	2.95c.

Tin Plate	
Base per Box	
Standard cokes, f.o.b. P'gh district mill	\$5.25
Standard cokes, f.o.b. Gary	\$5.35
Standard cokes, f.o.b. cars dock Pacific ports	5.90

Terne Plate	
(F.o.b. Pittsburgh)	
(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.	
Base per Lb.	
All widths up to 24 in., P'gh.	2.00c.
All widths up to 24 in., Chicago	2.10c.
All widths up to 24 in., del'd Detroit	2.20c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips	
F.o.b. Pittsburgh	2.80c.
F.o.b. Cleveland	2.80c.
Del'd Chicago	3.08c.
F.o.b. Worcester	3.00c.

Fender Stock	
No. 16 and heavier, Pittsburgh or Cleveland	3.20c.
F.o.b. Worcester	3.60c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)	
To Manufacturing Trade	
Per Lb.	
Bright wire	2.30c.
Spring wire	3.20c.

To Jobbing Trade	
Extras of 10c. a 100 lb. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire	

products. An allowance of \$2 a ton is made to jobbers on straight, naked or joint carloads; \$3 a ton is allowed on less-than-carload shipments.

Base per Keg	
Standard wire nails	\$2.60
Smooth coated nails	2.60
Galvanized nails	
15 gage and coarser	4.00
16 gage and finer	5.10
Base per 100 Lb.	
Smooth annealed wire	\$2.45
Smooth galvanized wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Harbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE

Welded Pipe	
Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills	
Butt Weld	
Steel	Wrought Iron
Inches	Inches
Black Galv.	Black Galv.
1/4 to 3/8	1/4 to 3/8
3/8 to 1/2	3/8 to 1/2
1/2 to 3/4	1/2 to 3/4
3/4 to 1	3/4 to 1
1 to 1 1/2	1 to 1 1/2
1 1/2 to 2	1 1/2 to 2
2 to 2 1/2	2 to 2 1/2
2 1/2 to 3	2 1/2 to 3
3 to 3 1/2	3 to 3 1/2
3 1/2 to 4	3 1/2 to 4
4 to 4 1/2	4 to 4 1/2
4 1/2 to 5	4 1/2 to 5
5 to 5 1/2	5 to 5 1/2
5 1/2 to 6	5 1/2 to 6
6 to 6 1/2	6 to 6 1/2
6 1/2 to 7	6 1/2 to 7
7 to 7 1/2	7 to 7 1/2
7 1/2 to 8	7 1/2 to 8
8 to 8 1/2	8 to 8 1/2
8 1/2 to 9	8 1/2 to 9
9 to 9 1/2	9 to 9 1/2
9 1/2 to 10	9 1/2 to 10
10 to 10 1/2	10 to 10 1/2
10 1/2 to 11	10 1/2 to 11
11 to 11 1/2	11 to 11 1/2
11 1/2 to 12	11 1/2 to 12
12 to 12 1/2	12 to 12 1/2
12 1/2 to 13	12 1/2 to 13
13 to 13 1/2	13 to 13 1/2
13 1/2 to 14	13 1/2 to 14
14 to 14 1/2	14 to 14 1/2
14 1/2 to 15	14 1/2 to 15
15 to 15 1/2	15 to 15 1/2
15 1/2 to 16	15 1/2 to 16
16 to 16 1/2	16 to 16 1/2
16 1/2 to 17	16 1/2 to 17
17 to 17 1/2	17 to 17 1/2
17 1/2 to 18	17 1/2 to 18
18 to 18 1/2	18 to 18 1/2
18 1/2 to 19	18 1/2 to 19
19 to 19 1/2	19 to 19 1/2
19 1/2 to 20	19 1/2 to 20
20 to 20 1/2	20 to 20 1/2
20 1/2 to 21	20 1/2 to 21
21 to 21 1/2	21 to 21 1/2
21 1/2 to 22	21 1/2 to 22
22 to 22 1/2	22 to 22 1/2
22 1/2 to 23	22 1/2 to 23
23 to 23 1/2	23 to 23 1/2
23 1/2 to 24	23 1/2 to 24
24 to 24 1/2	24 to 24 1/2
24 1/2 to 25	24 1/2 to 25
25 to 25 1/2	25 to 25 1/2
25 1/2 to 26	25 1/2 to 26
26 to 26 1/2	26 to 26 1/2
26 1/2 to 27	26 1/2 to 27
27 to 27 1/2	27 to 27 1/2
27 1/2 to 28	27 1/2 to 28
28 to 28 1/2	28 to 28 1/2
28 1/2 to 29	28 1/2 to 29
29 to 29 1/2	29 to 29 1/2
29 1/2 to 30	29 1/2 to 30
30 to 30 1/2	30 to 30 1/2
30 1/2 to 31	30 1/2 to 31
31 to 31 1/2	31 to 31 1/2
31 1/2 to 32	31 1/2 to 32
32 to 32 1/2	32 to 32 1/2
32 1/2 to 33	32 1/2 to 33
33 to 33 1/2	33 to 33 1/2
33 1/2 to 34	33 1/2 to 34
34 to 34 1/2	34 to 34 1/2
34 1/2 to 35	34 1/2 to 35
35 to 35 1/2	35 to 35 1/2
35 1/2 to 36	35 1/2 to 36
36 to 36 1/2	36 to 36 1/2
36 1/2 to 37	36 1/2 to 37
37 to 37 1/2	37 to 37 1/2
37 1/2 to 38	37 1/2 to 38
38 to 38 1/2	38 to 38 1/2
38 1/2 to 39	38 1/2 to 39
39 to 39 1/2	39 to 39 1/2
39 1/2 to 40	39 1/2 to 40
40 to 40 1/2	40 to 40 1/2
40 1/2 to 41	40 1/2 to 41
41 to 41 1/2	41 to 41 1/2
41 1/2 to 42	41 1/2 to 42
42 to 42 1/2	42 to 42 1/2
42 1/2 to 43	42 1/2 to 43
43 to 43 1/2	43 to 43 1/2
43 1/2 to 44	43 1/2 to 44
44 to 44 1/2	44 to 44 1/2
44 1/2 to 45	44 1/2 to 45
45 to 45 1/2	45 to 45 1/2
45 1/2 to 46	45 1/2 to 46
46 to 46 1/2	46 to 46 1/2
46 1/2 to 47	46 1/2 to 47
47 to 47 1/2	47 to 47 1/2
47 1/2 to 48	47 1/2 to 48
48 to 48 1/2	48 to 48 1/2
48 1/2 to 49	48 1/2 to 49
49 to 49 1/2	49 to 49 1/2
49 1/2 to 50	49 1/2 to 50
50 to 50 1/2	50 to 50 1/2
50 1/2 to 51	50 1/2 to 51
51 to 51 1/2	51 to 51 1/2
51 1/2 to 52	51 1/2 to 52
52 to 52 1/2	52 to 52 1/2
52 1/2 to 53	52 1/2 to 53
53 to 53 1/2	53 to 53 1/2
53 1/2 to 54	53 1/2 to 54
54 to 54 1/2	54 to 54 1/2
54 1/2 to 55	54 1/2 to 55
55 to 55 1/2	55 to 55 1/2
55 1/2 to 56	55 1/2 to 56
56 to 56 1/2	56 to 56 1/2
56 1/2 to 57	56 1/2 to 57
57 to 57 1/2	57 to 57 1/2
57 1/2 to 58	57 1/2 to 58
58 to 58 1/2	58 to 58 1/2
58 1/2 to 59	58 1/2 to 59
59 to 59 1/2	59 to 59 1/2
59 1/2 to 60	59 1/2 to 60
60 to 60 1/2	60 to 60 1/2
60 1/2 to 61	60 1/2 to 61
61 to 61 1/2	61 to 61 1/2
61 1/2 to 62	61 1/2 to 62
62 to 62 1/2	62 to 62 1/2
62 1/2 to 63	62 1/2 to 63
63 to 63 1/2	63 to 63 1/2
63 1/2 to 64	63 1/2 to 64
64 to 64 1/2	64 to 64 1/2
64 1/2 to 65	64 1/2 to 65
65 to 65 1/2	65 to 65 1/2
65 1/2 to 66	65 1/2 to 66
66 to 66 1/2	66 to 66 1/2
66 1/2 to 67	66 1/2 to 67
67 to 67 1/2	67 to 67 1/2
67 1/2 to 68	67 1/2 to 68
68 to 68 1/2	68 to 68 1/2
68 1/2 to 69	68 1/2 to 69
69 to 69 1/2	69 to 69 1/2
69 1/2 to 70	69 1/2 to 70
70 to 70 1/2	70 to 70 1/2
70 1/2 to 71	70 1/2 to 71
71 to 71 1/2	71 to 71 1/2
71 1/2 to 72	71 1/2 to 72
72 to 72 1/2	72 to 72 1/2
72 1/2 to 73	72 1/2 to 73
73 to 73 1/2	73 to 73 1/2
73 1/2 to 74	73 1/2 to 74
74 to 74 1/2	74 to 74 1/2

Wire Rods

	Per Gross Ton
Pittsburgh	\$38.00
Cleveland	38.00
Chicago	39.00
Birmingham	41.00
Youngstown (del'd)	39.00

ALLOY STEEL BLOOMS, BILLETS AND SLABS

F.o.b. Pittsburgh, Chicago, Buffalo, Massillon, Canton or Bethlehem.
Base price, \$51 a gross ton.
Price del'd Detroit is \$54.

CARBON STEEL FORGING INGOTS

F.o.b. Pittsburgh, Youngstown, Cleveland, Gary, Chicago or Birmingham.
Unrepacked, \$31 per gross ton.

COKE, COAL AND FUEL OIL

Coke		Per Net Ton
Furnace, f.o.b. Connellsville	Prompt	\$3.85
Furnace, f.o.b. Connellsville	Prompt	\$4.60 to 5.60
Foundry, by-product, Chicago	ovens, for delivery outside	8.50
Foundry, by-product, Chicago	switching district, delivered	9.25
Foundry, by-product, New	England, delivered	11.00
Foundry, by-product, Phila.	or Jersey City, del'd	8.20 to 9.00
Foundry, by-product, Cleve-	land, delivered	9.25
Foundry, by-product, St.	Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd	St. Louis	9.00

Coal		Per Net Ton
Mine run steam coal, f.o.b.	W. Pa. mines	\$1.80 to \$2.05
Mine run coking coal, f.o.b.	W. Pa. mines	2.05 to 2.25
Gas coal, 1/2-in. f.o.b. Pa.	mines	2.25 to 2.55
Mine run gas coal, f.o.b. Pa.	mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa.	mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa.	mines	1.90 to 2.10

Fuel Oil		Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate		4.00c.
No. 4 industrial		3.50c.
Per Gal. f.o.b. Baltimore		
No. 3 distillate		4.00c.
No. 4 industrial		3.50c.
Per Gal. del'd Chicago		
No. 3 industrial fuel oil		3.73c.
No. 5 industrial fuel oil		3.00c.
Per Gal. f.o.b. Cleveland		
No. 3 distillate		5.75c.
No. 4 industrial		5.50c.
No. 5 industrial		4.75c.

REFRACTORIES

Fire Clay Brick		Per 1000 f.o.b. Works
High-heat Intermediate	Duty Brick	\$45.00
Duty Brick	Duty Brick	\$40.00
Pennsylvania		45.00
Maryland		45.00
New Jersey		45.00
Ohio		45.00
Kentucky		45.00
Missouri		45.00
Illinois		45.00
Ground fire clay, per	ton	7.00

Chrome Brick

Standard size	Per Net Ton
	\$45.00

Silica Brick

Per 1000 f.o.b. Works	
Pennsylvania	\$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	9.00

Magnesite Brick

Per Net Ton	
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$65.00
Unburned, f.o.b. Baltimore and Chester, Pa.	55.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

Per Net Ton	
6-in. and larger, del'd	
Chicago	\$44.00 to \$45.00
4-in., del'd Chicago	47.00 to 48.00
6-in. and larger, del'd New York	43.00
4-in. del'd New York	46.00
6-in. and larger, Birmingham,	36.00 to 37.00
4-in. Birmingham	39.00 to 40.00
Class "A" and gas pipe, \$3 extra	

Pig Iron, Ores, Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$19.50	\$20.00	\$19.00	\$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Svedeland, Pa.	19.50	20.00	19.00	20.50
Sparrows Point, Md.	18.50	18.50	18.00	19.00
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharnsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	19.00	17.50	19.50
Buffalo	18.50	19.00	18.00	19.50
Erie, Pa.	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	20.25	19.75	19.00
Detroit, Ohio	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	19.00
Duluth, Minn.	19.00	19.00	19.50	19.00
Birmingham	14.50	14.50	13.50	14.00
Provo, Utah	17.50	17.00	17.00	17.00

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	\$20.00	\$20.50	\$19.50	\$21.00
Brooklyn				
From East Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.	20.89	21.39	20.39	21.89
Philadelphia				
From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati				
From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio				
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio				
From Hamilton, Ohio	20.50	20.50	19.50	20.50
Mansfield, Ohio				
From Cleveland and Toledo	20.26	20.26	19.26	20.26
Indianapolis				
From Hamilton, Ohio	20.77	20.77	19.77	20.77
South Bend, Ind.				
From Chicago	20.55	20.55	19.55	20.55
Milwaukee				
From Chicago	19.50	19.50	18.50	19.50
St. Paul				
From Duluth	20.44	20.44	19.44	20.44
Davenport, Iowa				
From Chicago	20.26	20.26	19.26	20.26
Kansas City				
From Granite City	21.04	21.04	20.04	21.04

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points: Birdsboro, Pa., Steel-	\$23.50
ton, Pa., and Standish, N. Y.	19.50
Johnson City, Tenn.	25.15
Del'd Chicago	25.15

GRAY FORCE PIG IRON

Valley furnace	\$17.50
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CHARCOAL PIG IRON

Lake Superior furnace	\$21.00
Delivered Chicago	24.04
Delivered Buffalo	24.28

CANADA

Pig Iron

Per gross ton:	
Delivered Toronto	
No. 1 fdry., sil. 2.25 to 2.75	\$21.00
No. 2 fdry., sil. 1.75 to 2.75	20.50
Malleable	21.00
Delivered Montreal	
No. 1 fdry., sil. 2.25 to 2.75	\$22.50
No. 2 fdry., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

Ferromanganese

Per Gross Ton	
Domestic, 80%, seaboard,	\$85.00
Domestic, 80%, seaboard,	(ton lots) 92.00

Spiegeleisen

Per Gross Ton Furnace	
Domestic, 19 to 21%	\$26.00

Electric Ferrosilicon

Per Gross Ton Delivered	
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	126.00
75% (ton lots)	136.00
14% to 16% (f.o.b.) Welland	
Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace	
Per Gross Ton	
6%	\$22.25
7%	23.25
8%	24.25
9%	25.25
10%	26.25
11%	27.75
Per Gross Ton	
12%	\$29.25
13%	30.75
14%	32.75
15%	33.75
16%	35.25
17%	36.75

Ferrovanadium, del., per lb. contained V.....	\$2.70 to \$2.90
Ferrocobalt, 15 to 18% Ti, 6 to 3% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage.....	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage.....	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
2% carbon grade	95.00
1% carbon grade	105.00
Spot prices	\$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range, Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68 1/4% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52% 48%	24c.
Manganese, African, Indian, 44%	21c.
Manganese, African, Indian, 49%	24c.
Manganese, Brazilian, 46 to 48 1/2%	20c.

Per Net Ton Unit	
Tungsten, Chinese, wolframite, duty paid, delivered*	\$17.50 to \$18.00
Tungsten, domestic scheelite, delivered*	\$17.25

Per Gross Ton	
Chrome, 45%, Cr2O3, crude, c.i.f. Atlantic Seaboard	\$17.00
Chrome, 48% Cr2O3, c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales.
†No scheelite available at this bid price.

Fluorspar

Per Net Ton	
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	\$17.00
Same grade for Ohio River barge shipment for Kentucky and Illinois River landings	18.50
No. 3 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$17.50 to 18.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silicon, f.o.b. Illinois and Kentucky mines	20.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$12.50 to \$13.00
No. 2 heavy melting steel	11.50 to 12.00
No. 2 railroad wrought	12.50 to 13.00
Scrap rails	12.50 to 13.00
Rails 3 ft. and under	15.50 to 16.00
Sheet bar crops, ordinary	13.00 to 15.50
Compressed sheet steel	12.50 to 13.00
Hand bundled sheet steel	11.00 to 11.50
Hvy. steel axle turnings	12.00 to 12.50
Machine shop turnings	8.50 to 9.00
Short shov. steel turnings	8.50 to 9.00
Short mixed borings and turnings	8.50 to 9.00
Cast iron borings	8.50 to 9.00
Cast iron car wheels	12.50 to 13.00
Heavy breakable cast	11.00 to 11.50
No. 1 cast	13.00 to 13.50
Rail. knuckles and couplers	15.25 to 15.75
Rail. coil and leaf springs	15.25 to 15.75
Hollow steel wheels	15.25 to 15.75
Low phos. billet crops	16.50 to 17.00
Low phos. sheet bar crops	16.00 to 16.50
Low phos. plate scrap	15.00 to 15.50
Low phos. punchings	15.50 to 16.00
Steel car axles	16.50 to 17.00

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$10.75 to \$11.25
Automobile hvy. melt. steel	10.00 to 10.50

Shoveling steel	\$10.75 to \$11.25
Hydraulic comp. sheets	9.75 to 10.25
Drop forge flashings	9.00 to 9.50
No. 1 busheling	9.75 to 10.25
Roller car wheels	11.75 to 12.25
Railroad tires	11.75 to 12.25
Railroad leaf springs	11.75 to 12.25
Axle turnings	8.75 to 9.25
Steel couplers and knuckles	11.50 to 12.00
Coil springs	12.00 to 12.50
Axle turnings (elec. fur.)	9.75 to 10.25
Low phos. punchings	11.50 to 12.00
Low phos. plates, 12 in. and under	11.50 to 12.00
Cast iron borings	6.50 to 7.00
Short shoveling turnings	6.50 to 7.00
Machining shop turnings	6.25 to 6.75
Rolling mill turnings	12.00 to 12.50
Steel rails, less than 3 ft.	12.00 to 12.50
Steel rails, less than 2 ft.	12.50 to 13.00
Angle bars, steel	11.75 to 12.25
Cast iron car wheels	11.25 to 11.75
Railroad malleable	11.50 to 12.00
Agricultural malleable	9.50 to 10.00

Per Net Ton	
Iron car axles	\$12.25 to \$12.75
Steel car axles	11.50 to 12.00
No. 1 railroad wrought	8.75 to 9.25
No. 2 railroad wrought	9.50 to 10.00

No. 2 busheling	\$3.75 to \$4.25
Locomotive tires, smooth	9.75 to 10.25
Pipe and flues	5.00 to 5.50
No. 1 machinery cast	9.00 to 9.50
Clean automobile cast	8.50 to 9.00
No. 1 railroad cast	8.50 to 9.00
No. 1 agricultural cast	7.50 to 8.00
Stove plate	7.00 to 7.50
Grate bars	6.00 to 6.50
Brake shoes	8.00 to 8.50

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.00 to \$11.50
No. 2 heavy melting steel	8.50 to 9.00
No. 1 railroad wrought	12.00 to 13.00
Bundled sheets	9.50
Hydraulic compressed, new	10.00
Hydraulic compressed, old	8.00 to 8.50
Machine shop turnings	6.50 to 7.00
Heavy axle turnings	9.50 to 10.00
Cast borings	5.50 to 6.00
Heavy breakable cast	11.00 to 11.50
Stove plate (steel works)	8.50 to 9.00
No. 1 low phos. heavy	15.00 to 15.50
Couplers and knuckles	14.00 to 14.50
Roller steel wheels	14.00 to 14.50
No. 1 blast furnace	5.50 to 6.00
Spec. iron and steel pipe	9.00
Shafting	16.00 to 16.50
Steel axles	14.50
No. 1 forge fire	10.00 to 10.50
Cast iron car wheels	12.50 to 13.00
No. 1 cast	12.00 to 12.50
Cast borings (chem.)	12.00 to 12.50
Steel rails for rolling	13.00

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.00 to \$11.00
No. 2 heavy melting steel	10.00 to 10.50
Compressed sheet steel	10.00 to 10.50
Light bundled sheet stampings	7.50 to 8.00
Drop forge flashings	9.50 to 10.00
Machine shop turnings	8.25 to 8.50
Short shoveling turnings	8.00 to 8.25
No. 1 busheling	9.50 to 10.00
Steel axle turnings	9.00 to 9.50
Low phos. billet crops	14.25 to 14.75
Cast iron borings	8.25 to 8.75
Mixed borings and short turnings	8.25 to 8.75
No. 2 busheling	8.25 to 8.75
No. 1 cast	12.00 to 12.50
Railroad grate bars	7.50 to 8.00
Stove plate	7.00 to 7.50
Rails under 3 ft.	15.00 to 15.50
Rails for rolling	16.50 to 17.00
Railroad malleable	12.00 to 12.50
Cast iron carwheels	12.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' yards:	
No. 1 heavy melting steel	\$11.50 to \$12.00
No. 2 heavy melting scrap	10.00 to 10.50
Scrap rails	11.00 to 11.50
New hydrant, comp. sheet	10.00 to 10.50
Old hydrant, comp. sheet	9.00 to 9.50
Drop forge flashings	10.00 to 10.50
No. 1 busheling	10.00 to 10.50
Hvy. steel axle turnings	8.00 to 8.50
Machine shop turnings	5.50 to 6.00
Knuckles and couplers	13.00 to 13.50
Coll and leaf springs	13.00 to 13.50
Roller steel wheels	13.00 to 13.50
Low phos. billet crops	13.00 to 13.50
Short shov. steel turnings	6.50 to 7.00
Short mixed borings and turnings	6.50 to 7.00
Cast iron borings	6.50 to 7.00
No. 2 busheling	6.50 to 7.00
Steel car axles	12.00 to 12.50
Iron axles	12.00 to 12.50
No. 1 machinery cast	12.00 to 12.50
No. 1 cupola cast	10.00 to 10.50
Stove plate	9.50 to 9.75
Steel rails, 3 ft. and under	13.50 to 14.00
Cast iron carwheels	11.50 to 12.00
Industrial malleable	11.50 to 12.00
Railroad malleable	11.50 to 12.00
Chemical borings	8.50 to 9.00

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$10.00
Scrap steel rails	9.00
Short shoveling turnings	5.50
Stove plates	\$7.00 to 7.50
Steel axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	10.50 to 11.00
Rails for rolling	10.50
No. 1 cast	9.00 to 9.50
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$9.00 to \$9.50
No. 1 heavy melting	8.50 to 9.00
No. 2 heavy melting	7.50 to 8.00
No. 1 locomotive tires	9.50 to 10.00
Misc. stand.-sec. rails	9.25 to 9.75
Railroad springs	11.00 to 11.50
Bundled sheets	7.25 to 7.75
No. 2 railroad wrought	8.50 to 9.00
No. 1 busheling	6.25 to 6.75
Cast iron borings and shoveling turnings	5.00 to 5.50
Rails for rolling	10.75 to 11.25
Machine shop turnings	4.75 to 5.25
Heavy turnings	6.00 to 6.50
Steel car axles	10.50 to 11.00
Iron car axles	13.00 to 13.50
No. 1 railroad wrought	6.00 to 6.50
Steel angle bars	9.00 to 9.50
Cast iron carwheels	8.00 to 8.50
No. 1 machinery cast	9.00 to 9.50
Railroad malleable	9.50 to 10.00
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Acrluitt. malleable	9.00 to 9.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to \$7.25
Scrap T rails	7.00 to 7.25
No. 2 steel	5.50 to 5.75
Breakable cast	6.25 to 6.50
Machine shop turnings	2.80
Bundled skeleton, long	5.00 to 5.25
Forge flashings	5.00 to 5.25
Blast furnace scrap	2.50 to 3.00
Shafting	11.00 to 11.25
Steel car axles	10.50 to 11.00
Wrought pipe	5.00 to 5.25
Cast iron borings, chemical	8.00 to 8.50
Stove plate	6.50
Per gross ton delivered consumers' yards:	
Textile cast	\$8.75 to \$9.00
No. 1 machinery cast	9.50 to 10.00
Railroad malleable	11.00 to 11.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.50 to \$8.50
No. 2 heavy melting steel	7.00 to 7.25
Heavy breakable cast	7.50 to 8.00
No. 1 machinery cast	8.00
No. 2 cast	6.50 to 7.00
Stove plate	6.00
Steel car axles	10.75 to 11.50
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00

*For direct car loading only.
†Loading on barge.

Spec. iron and steel pipe	\$4.50 to \$5.00
Forge fire	5.50 to 6.00
Rails for re-rolling	9.50 to 10.00
Short shoveling turnings	3.50 to 4.00
Machine shop turnings	3.50 to 4.00
Cast borings	4.50 to 4.75
No. 1 blast furnace	2.50 to 4.00
Cast borings (chemical)	11.00 to 11.50
Unprepared yard iron and steel	4.00 to 4.50
Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$11.50
No. 1 hvy. cast (cupola size)	10.50
No. 2 cast	9.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$8.25 to \$9.00
Scrap rails for melting	9.00 to 9.50
Loose sheet clippings	4.75 to 5.25
Bundled sheets	6.50 to 7.00
Cast iron borings	6.00 to 6.50
Machine shop turnings	3.50 to 6.00
No. 1 busheling	7.00 to 7.50
No. 2 busheling	3.50 to 4.00
Rails for rolling	9.50 to 10.00
No. 1 locomotive tires	9.00 to 9.50
Short rails	11.75 to 12.25
Cast iron carwheels	8.25 to 8.75
No. 1 machinery cast	9.50 to 10.00
No. 1 railroad cast	9.00 to 9.50
Burnt cast	5.50 to 6.00
Stove plate	6.50 to 7.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$8.50 to \$9.00
Borings and short turnings	6.50 to 7.00
Long turnings	5.50 to 6.00
No. 1 machinery cast	9.50 to 10.00
Automotive cast	11.00 to 11.50
Hydrant, comp. sheet	8.50 to 9.00
Stove plate	7.00 to 7.50
New factory busheling	7.50 to 8.00
Old No. 2 busheling	5.00 to 5.50
Sheet clippings	5.00 to 5.50
Flashings	7.50 to 8.00
Low phos. plate scrap	8.75 to 9.25

CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$5.50 \$5.50
Rails scrap	6.00 4.50
Machine shop turnings	2.50 2.50
Holler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	3.00 3.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axles	4.50 6.00
Axles wrought iron	4.50 4.50
No. 1 machinery cast	7.75 9.00
Stove plate	4.50 5.00
Standard carwheels	7.25 7.00
Malleable	6.75 7.00

Warehouse Prices for Steel Products

PITTSBURGH

Base per Lb.	
Plates	3.20c
Structural shapes	3.20c
Soft steel bars and small shapes	3.00c
Reinforcing steel bars	3.00c
Cold-finished and screw stock—	
Rounds and hexagons	*3.45c
Squares and flats	*3.45c
Hoops and bands under 1/4 in.	3.55c
Hot-rolled annealed sheets (No. 24)	2.85c
25 or more bundles	3.55c
Galv. sheets (No. 24), 25 or more bundles	4.10c
Hot-rolled sheets (No. 10)	3.10c
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.32
Spikes, large	2.80c
Track bolts, all sizes, per 100 count	65 per cent off list.
Machine bolts, 100 count	65 per cent off list.
Carriage bolts, 100 count	65 per cent off list.
Nuts, all styles, 100 count	65 per cent off list.
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'd, base per 100 lb.	\$2.70c
Wire, galv. soft, base per 100 lb.	\$2.925c
Common wire nails, per keg	*\$2.81c
Cement coated nails, per keg	*\$2.83c

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 9999 lb.
*Delivered in Pittsburgh switching district.

CHICAGO

Base per Lb.	
Plates and structural shapes	3.10c
Soft steel bars	2.90c
Cold-fin. steel bars and shafting	3.50c
Rounds and hexagons	3.50c
Plates and squares	3.50c
Bands, 3/16 in. (in Nos. 10 and 12 gages)	3.30c
Hoops (No. 14 gage and lighter)	3.20c
Hot-rolled annealed sheets (No. 24)	3.85c
Galv. sheets (No. 24)	4.45c
Hot-rolled sheets (No. 10)	2.85c
Spikes (9/16 in. and lighter)	3.50c
Track bolts	4.65c
Rivets, structural (keg lots)	3.50c
Rivets boiler (keg lots)	3.60c
Per Cent Off List	
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or blank	60 and 5
Hot-pressed nuts, hex. tap or blank	60 and 5
Hex. head and cap screws	80
Cup point set screws	70
Flat head bright wood screws	37 1/2 and 10
Spring cotters	70 and 10
Stove bolts in full packages	70 and 10
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$5.50 off list
No. 8 black ann'd wire per 100 lb.	\$3.85
Comm. wire nails, base per keg	3.05c
Cement c'd nails, base per keg	3.05c

NEW YORK

Base per Lb.	
Plates, 1/4 in. and heavier	3.45c
Structural shapes	3.42c
Soft steel bars, small shapes	3.32c
Iron bars	3.32c
Iron bars, swed. charcoal	6.50 to 7.25c
Cold-fin. shafting and screw stock	3.92c
Rounds and hexagons	4.42c
Flats and squares	4.42c
Cold-roll. strip, soft and quarter hard	3.52c
Hoops	3.67c
Bands	3.67c
Hot-rolled sheets (No. 10)	3.42c
Hot-rolled ann'd sheets (No. 24*)	4.05c
Galvanized sheets (No. 24*)	4.65c
Long term sheets (No. 24)	5.40c
Standard tool steel	11.00c
Wire, black annealed (No. 10)	3.30c
Wire, galv. (No. 10)	3.25c

Tire steel, 1 x 1/2 in. and larger	3.65c
Open heart spring steel	4.00c to 10.00c
Common wire nails, base, per keg	\$3.25
Per Cent Off List	
Machine bolts, cut thread:	
Up to 1 in. dia. inclusive	60
Over 1 in. dia.	50
Carriage bolts, cut thread:	
Up to 1/2 in. dia. inclusive	60
Over 1/2 in. dia.	50
Boiler tubes:	
Lap welded, 2-in.	Per 100 Ft. \$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

Base per Lb.	
Plates and struc. shapes	3.49c
Bars, soft steel or iron	3.29c
Cold-fin. rounds, shafting, screw stock	3.74c
Hot-rolled annealed sheets (No. 24)	3.94c
Galv. sheets (No. 24)	4.54c
Hot-rolled sheets (No. 10)	3.44c
Black corrug. sheets (No. 24)	3.99c
Galv. corrug. sheets	4.59c
Structural rivets	3.84c
Boiler rivets	3.94c
Per Cent Off List	
Tank rivets, 7/16 in. and smaller	60
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, pivot bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	60
1000 lb. or over	55 and 5
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.	
*Plates, 1/4-in. and heavier	3.00c
*Structural shapes	3.00c
*Soft steel bars, small shapes, iron bars (except bands)	3.00c
*Reinforce. steel bars, sq. twisted and deformed	2.95c
*Cold-finished steel bars	3.73c
*Steel hoops	3.55c
*Steel bands, No. 12 and 3/16 in.	3.30c
*Spring steel	5.00c
*Hot-rolled annealed sheets (No. 24)	3.80c
*Galvanized sheets (No. 24)	4.40c
*Hot-rolled annealed sheets (No. 10)	3.20c
Diam. pat. floor plates, 1/4 in.	5.00c
Swedish iron bars	6.25c

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.
‡For less than 2000 lb.

CLEVELAND

Base per Lb.	
Plates and struc. shapes	3.36c
Soft steel bars	3.05c
Reinforce. steel bars	3.10c
Cold-finished steel bars	3.40c
Flat rolled steel under 1/4 in.	3.51c
Cold-finished strip	73.20c
Hot-rolled annealed sheets (No. 24)	4.16c
Galvanized sheets (No. 24)	4.76c
Hot-rolled sheets (No. 10)	3.20c
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.61c
Black ann'd wire, per 100 lb.	\$2.65
No. 9 galv. wire, per 100 lb.	3.00
Comm. wire nails, base per keg	2.40

*Plus mill. size and quantity extras.
†Outside delivery 10c. less.

CINCINNATI

Base per Lb.	
Plates and struc. shapes	3.45c
Bars, soft steel or iron	3.25c

BUFFALO

	Base per Lb
Plates	3.40c
Struc. shapes	3.30c
Soft steel bars	3.10c
Reinforcing bars	2.10c
Cold-fin. flats and sq.	3.55c
Round and hex.	3.55c
Cold-rolled strip steel	5.55c
Hot-rolled annealed sheets (No. 24)	3.40c
Heavy hot-rolled sheets, 3/16 in.	3.40c
Galv. sheets (No. 24)	4.65c
Rands	3.57c
Hoops	3.57c
Hot-rolled unannealed sheets.	3.32c
Comm. wire nails, base per keg	\$3.40
Black wire, base per 100 lb.	3.45c

Pipe Lines

United Natural Gas Co., Oil City, Pa., has authorized about 5000 ft. in Front Street for natural gas trunk line, replacing present line.

Humble Pipe Line Co., Humble Building, Houston, Tex., affiliated with Humble Oil & Refining Co., plans new 6-in. welded steel pipe line in new oil field district in San Patricio County.

Stanolind Pipe Line Co., Tulsa, Okla., affiliated with Stanolind Oil & Gas Co., same address, plans new welded steel pipe line from point near Humboldt, Kan., to refinery of Standard Oil Co. of Indiana, at Neodesha, Kan., about 150 miles. Cost over \$1,000,000. Stanolind companies are subsidiaries of Standard Oil Co. of Indiana.

Montana-Eastern Pipe Line Co., Billings, Mont., plans welded steel pipe line for natural gas service at Mandan, Dickinson, Williston and Bismarck, N. D., and vicinity. Application has been made for franchises.

Water and Power Commission, Los Angeles, has rejected bids recently received for electric welded steel pipe and proposes purchase in open market (Specification 1401), or immediate call for new bids.

Great Lakes Pipe Line Co. has ordered 189 miles of 9-in. pipe, calling for 11,000 tons, from A. O. Smith Corp., Milwaukee.

Railroad Equipment

Reading Railroad has bought 8000 tons of rails from Bethlehem Steel Co. and 2000 tons from Carnegie Steel Co.

Boston & Maine has placed 21 suburban passenger coaches and 10 all-conditioned de luxe coaches with Pullman-Bradley Car Corp., Worcester, Mass., five Pacific-type passenger locomotives with Lima Locomotive Co., five Mountain-type freight and passenger locomotives with Baldwin Locomotive Works; one Diesel electric locomotive with body built by St. Louis Car Co., Diesel engine built by Ingersoll-Rand Co., electrical apparatus built by General Electric Co.; one Diesel electric locomotive with body built by Bethlehem Steel Co., engine and electrical apparatus by Westinghouse Electric & Mfg. Co.; one Diesel electric switching engine, Diesel engine built by McIntosh & Seymour Co., chassis and trucks by American Locomotive Co., electrical apparatus by General Electric Co.; one Diesel electric switching engine, engine built by Ingersoll-Rand Co., chassis, trucks and electrical apparatus by General Electric Co. Total cost of equipment \$2,500,000.

Missouri Southern is inquiring for one oil-electric or gas-electric locomotive.

Baltimore & Ohio has ordered 16 streamline passenger coaches from American Car & Foundry Co.

Chicago Great Western has ordered 500 box cars from Pullman Car & Mfg. Corp.

RAILS

Union Pacific has ordered 10,000 tons of rails from Colorado Fuel & Iron Co., 10,000 tons from Illinois Steel Co., and 5000 tons from Inland Steel Co.

Board of Harbor Commissioners, Los Angeles, will take bids soon for a municipal terminal railroad connection which will require 1915 tons of rails, 1046 joints, 1600 tie plates and 38,600 spikes.

Cast Iron Pipe

Pulaski, N. Y., closed bids May 14 for 16,500 ft. of 12-in.

Columbus, Ga., asks bids until June 1 for 4900 ft. of 20-in. for water trunk line.

Danville, Ky., plans pipe line to Herrington Lake for water supply and will make surveys at once. Howard K. Bell, Lexington, Ky., is engineer.

McEwen, Tenn., asks bids until May 22 for water pipe line. Freeland, Roberts & Co., Independent Life Building, Nashville, Tenn., are consulting engineers.

Mesa, Ariz., plans water pipe line. Fund of \$74,100 is being arranged for this and other work.

Canadian, Tex., plans 6 and 8-in. for water supply. Fund of \$31,000 has been authorized, including waterworks pumping station, etc. J. H. Gehbaur is consulting engineer.

Chicago will buy 1100 tons of 12 and 16-in.

Marathon, Wis., has authorized bonds for \$40,500 for water pipe lines, waterworks station, etc. W. G. Kirchoffer, 22 North Carroll Street, Madison, Wis., is engineer.

Milwaukee closes bids May 24 on 130 tons of Class C and special castings.

Cedar Rapids, Iowa, plans fund of \$140,000 for water pipe line extensions.

Liberal, Mo., plans water pipe line. Fund of \$48,000 is being arranged. Henrici-Lowry Engineering Co., 114 West Tenth Street, Kansas City, Mo., is engineer.

Thompson Falls, Mont., plans water pipe line. Special election will be held July 14 to approve bonds for \$50,000 for this and waterworks station, etc.

Galt County Water District, Galt, Cal., plans pipe line. Special election will soon be held to approve bonds for \$50,000.

Oakland, Cal., has awarded 935 tons to United States Cast Iron Pipe Co. and 1025 tons to American Cast Iron Pipe Co.

Ordway, Colo., has taken bids on 645 tons of 4 to 8-in.

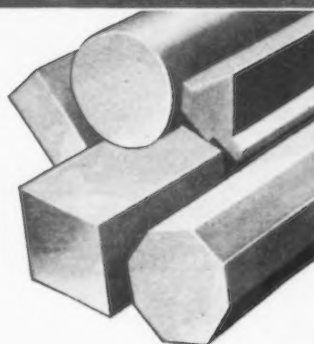
Naval Purchasing Officer, San Francisco, has taken bids on 165 tons of 4-in.

Gilroy, Cal., has voted approval of \$38,000 of bonds for water system improvements and has applied for a PWA loan.

Chain Belt Co., Milwaukee, has placed stock in its Detroit warehouse, 5169 Martin Ave., consisting of all types of malleable and steel chains, steel roller chain, chain sprockets, buckets, set collars, pillow blocks and takeups. C. E. Martin is in charge.

*The Rapid Duplication
of Machined Steel Parts
at Lowest Cost Continues
to Depend Upon That
Perfection and Precision
Which Only*

**COLD DRAWN STEELS
CAN GIVE**



WYCKOFF

In this period of exceptionally close margins,—you cannot afford to take chances with an inferior product. Only through the use of cold drawn steel bars such as are manufactured by this company, can you obtain the increased physical characteristics, exactness to size, straightness and guaranteed machining performance so essential to the maintenance of present-day production costs.

The WYCKOFF organization will welcome an opportunity of cooperating with you, any time,—anywhere.

WYCKOFF DRAWN STEEL COMPANY

GENERAL OFFICES—Ambridge, Penna.
MILLS—Ambridge, Penna. and Chicago, Ill.

Straits Tin Sharply Drops to 53.12½c.; Zinc at 4.35c. a lb. Considered Weak

Copper Situation Continues Uncertain as Minimum 8.50c. Price Rules—Spelter Bookings Total 2300 Tons—Lead Unchanged

NEW YORK, May 15.—The copper market continues most uncertain, with only very light bookings reported at the code-established prices of 8.50c. and 8.62½c. a lb., delivered Connecticut, for electro and Lake metal respectively. Sellers in this country are devoting considerable time to the market abroad, but only a moderate amount of metal was disposed of last week. Sales this morning were made on an equivalent cent basis of 8.35c. to 8.45c., c.i.f. Liverpool, Havre and Hamburg. At present nothing but Blue Eagle copper can be offered here, and there is an indication that practically all offerings in the future will be code metal at code prices, although the code authority has until May 21 to make public its decision regarding outside transactions. It is rather a surprise that heavier bookings are not in evidence inasmuch as all selling senti-

ment favors higher prices in the near future. As it has been, domestic producers have realized very little price benefit from the import duty. The duty has kept out foreign competition, but the world and domestic markets have never varied 1c., let alone the possible 4c. World prices will probably not go much below present levels; so the domestic trend would naturally be toward 9c. or 10c. metal now that the enormous reserve stocks of unwanted copper are not pressing on the market.

Tin

Following a decline in the preceding week, Straits tin in London moved downward more than £3 on Monday. The recession was naturally reflected here, and New York offerings this morning at 53.12½c. a lb. represented the lowest market level since early March. Despite the favor-

able conditions in consuming outlets here, there has been practically no buying against industrial accounts within recent weeks. Evidently consumers are waiting for further declines to result from the continued unsettled condition abroad. The reduction in London is attributed to the heavy selling on exchange in anticipation of increased tin supplies arising from the 10 per cent quota increase recently voted through by the International Tin Committee. This supply, however, will not reach the market for some time, and an additional stock reduction is expected in May.

Zinc

Spelter is now weakly established at 4.35c. a lb., East St. Louis, with only a light competitive demand in evidence. Although producers regard the long range situation optimistically, there is apparent selling pressure in several directions arising from a strong desire to get additional tonnages on books. Prime Western sales last week aggregated 2300 tons, mostly at 4.35c. for nearby positions, as compared with 2600 tons in the preceding week, and 2000 tons booked two weeks ago. Under the pressure of poor consumer demand and a lower price structure for refined metal, the Joplin ore market registered a \$1 decline to \$28 a ton for flotation concentrate last week. The week's output of 7400 tons was well above the average, sales were 4700 tons, shipments of 6100 tons were made, and bin stocks during the week rose about 1000 tons to 12,700 tons.

April shipments of refined metal fell under the March total, but an output reduction of 3159 tons served to force producers' stocks down 1386 tons to 109,375 tons. According to revised statistics, principal producers delivered 5831 tons of Prime Western in April at a weighted average price of 4.346c. a lb., as compared with 5218 tons at 4.377c. in March. During April, 12,115 tons was sold forward at 4.338c., against 3435 tons in March, and 9141 tons sold for subsequent delivery during February.

Lead

This commodity continues to sell in moderate lots on a steady basis of 4.25c., New York, or 4.10c., St. Louis, for prompt and June positions. All consuming outlets are taking metal, and May sales now total 28,000 tons whereas bookings for June delivery only amount to 6500 tons.

Brass and Bronze

The combined March deliveries of ingot brass and bronze made by members of the Non-Ferrous Ingot Metal Institute totaled 5291 tons. The average prices paid during the 28-day period ended April 20 by consumers of commercial 85-5-5-5 ingots and commercial 80-10-10 (1 per cent impurities) ingots were 8.393c. and 9.871c. a lb. respectively.

The Week's Prices. Cents Per Pound for Early Delivery

	May 9	May 10	May 11	May 12	May 14	May 15
Electrolytic copper, N. Y.*†	8.25	8.25	8.25	8.25	8.25	8.25
Lake copper, Eastern delivery*	8.62½	8.62½	8.62½	8.62½	8.62½	8.62½
Electrolytic copper, Connecticut†						
Straits tin, Spot, N. Y.	54.25	54.25	54.15	53.12½	53.12½	53.12½
Zinc, East St. Louis.	4.35	4.35	4.35	4.35	4.35	4.35
Zinc, New York.	4.70	4.70	4.70	4.70	4.70	4.70
Lead, St. Louis	4.10	4.10	4.10	4.10	4.10	4.10
Lead, New York	4.25	4.25	4.25	4.25	4.25	4.25

*Blue Eagle copper. †Outside market. ‡Price ¼c. higher in Connecticut valley.

Quotations below cover wholesale lots, f.o.b. New York.

Aluminum, 98-99 per cent, 22.90c. a lb.
Aluminum, remelt No. 12 (grade 2), 15.50c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb.; shot and ingot, remelt electro, 36c. a lb.
Antimony, 8.60c. a lb. Quicksilver, per flask of 76 lb., \$76.
Brass ingots, 85-5-5-5, 8.75c. a lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig.	55.00c. to 56.00c.
Tin, bar.	57.00c. to 58.00c.
Copper, Lake.	9.75c. to 10.50c.
Copper, electrolytic.	9.50c. to 10.00c.
Copper, castings.	9.25c. to 10.25c.
*Copper sheets, hot-rolled.	15.50c.
*High brass sheets.	14.25c.
*Seamless brass tubes.	16.75c.
*Seamless copper tubes.	16.75c.
*Brass rods.	12.75c.
Zinc, slabs.	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over.	10.25c.
Lead, American pig.	5.00c. to 6.00c.
Lead, bar.	6.00c. to 7.00c.
Lead, sheets.	8.00c.
Antimony, Asiatic.	9.75c.
Alum., virgin, 99 per cent, plus.	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent.	18.00c. to 19.00c.
Solder, ½ and ⅓.	32.50c. to 33.50c.
Babbitt metal, commercial grades.	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig.	57.25c.
Tin, bar.	59.25c.

Copper, Lake	9.50c.
Copper, electrolytic	9.50c.
Copper, castings	9.25c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig.	5.10c. to 5.35c.
Lead, bar	8.00c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade.	19.50c.
Babbitt metal, high grade.	61.25c.
Solder, ½ and ⅓	35.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.	6.62½c.	7.37½c.
Copper, hvy. and wire.	6.37½c.	7.12½c.
Copper, light and bottoms.	5.37½c.	6.37½c.
Brass, heavy.	3.50c.	4.25c.
Brass, light.	3.00c.	3.62½c.
Hvy. machine composition.	5.25c.	6.125c.
No. 1 yel. brass turnings.	4.37½c.	5.12½c.
No. 1 red brass or compos. turnings.	4.25c.	5.25c.
Lead, heavy.	3.25c.	3.75c.
Zinc.	2.50c.	3.125c.
Cast aluminum.	10.00c.	11.75c.
Sheet aluminum.	12.25c.	13.50c.

▲CORRESPONDENCE▲

Stainless Steel Welding Facilitated by New Rods

Editor, THE IRON AGE:

In the article on "Dairy Equipment of Stainless Steel," in THE IRON AGE of April 5, F. L. Prentiss states that "the development of efficient welders of stainless steel requires long training in welding this steel and a good welder of plain carbon steel cannot qualify as a welder of a stainless material until he has had long practical experience in welding the stainless steel."

This is contrary to our experience, as well as that of others. Stainless steel welding electrodes are now available that greatly facilitate this type of welding. With the Stainweld A rod made by the Lincoln Electric Co., for example, we find that a good plain carbon steel welder can use it very effectively because it flows so easily. Welders have said that it flows much easier than ordinary electrodes and is much easier to apply. Furthermore, use of such welding rods is becoming quite extensive, and is decidedly on the increase.

E. P. W. SMITH, consulting engineer, Lincoln Electric Co., Cleveland.

Reinforcing Steel

Awards 4625 Tons—New Projects
3100 Tons

AWARDS

New York, 125 tons, contract No. 14 for Tri-Borough Bridge, to Truscon Steel Co.

Newark, N. Y., 300 tons, State school, to Concrete Steel Co.

Somerset County, N. J., 135 tons, Raritan River bridge, to Kalman Steel Corp.

Warren, Pa., 100 tons, New Process Co. factory, to a Buffalo bidder.

Peoria, Ill., 200 tons, mesh and bars for sewer, to Concrete Engineering Co.

Des Moines, Iowa, 260 tons, grain elevator, to Concrete Engineering Co.

Rock Island, Ill., 100 tons, Augustana College, to Concrete Engineering Co.

State of Illinois, 150 tons, paving, to Concrete Engineering Co.

State of Illinois, 200 tons, paving, to Calumet Steel Co.

Chicago, 1260 tons, Sanitary District, to Illinois Steel Co.

St. Louis, 450 tons, third unit of municipal negro hospital, to Joseph T. Ryerson & Son, Inc.

Milwaukee, 600 tons, malt house for Froedtert Grain & Malting Co., to Worden-Allen Co.

State of Utah, 165 tons, highway work in four counties, to unnamed bidders.

State of Wyoming, 125 tons, highway work in three counties, to unnamed bidders.

Denver, 140 tons, material for three Bureau of Public Works projects, to unnamed bidders.

Seattle, 100 tons, University of Washington library addition, to Pacific Coast Steel Corp.

Oakland, Cal., 200 tons, Albers Brothers grain elevator, to Pacific Coast Steel Corp.

Newburyport, Mass., 300 tons, highway and two bridges.

Wellesley, Mass., 210 tons, two school units.

Waltham, Mass., 125 tons, hospital units.

Bettendorf, Iowa, 200 tons, bridge footings.

Boise, Idaho, 135 tons, State paving on Payette highway; bids May 22.

Pocatello, Idaho, 125 tons, city reservoir; bids May 24.

Denver, 1000 tons, Parker dam on Colorado River below Boulder dam; bids about July 1.

San Jose, Cal., 100 tons, County bridge over Guadalupe Creek; bids May 21.

Los Angeles, 100 tons, State paving on Wilmington Boulevard; bids May 31.

NEW REINFORCING BAR PROJECTS

Camden, N. J., 800 tons, contract No. 3 for subway approach to Camden-Philadelphia bridge; bids June 1 on general contract.

**FOR GREATER
SPEED, ACCURACY, ECONOMY!**

Can you save on machining costs by milling at higher speeds and faster feeds—by obtaining longer cutter life between grinds—by combining rough and finish cuts? Carboloy cutters can make this saving for you!

Will you benefit by greater accuracy, improved finish, minimum distortion of workpiece, milling harder materials? Carboloy cutters can bring you these benefits!

Carboloy cemented carbide milling offers you better quality of work and a greater margin of profit. Can you afford to be without Carboloy in these highly competitive days?

Base your decision on the facts! Ask for a demonstration or further information. Just send the coupon below. No obligation.

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Without obligation, kindly ☐ Demonstrate ☐ Supply further details on:
☐ Carboloy cutters for production work
☐ Carboloy standard \$85.00 cutter for diversified work

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COMPANY _____
CITY _____ STATE _____

**5" diameter, 12-bladed,
Carboloy general purpose
cutter, as illustrated.**

\$85.00

New! LOW-COST CUTTER FOR JOB-SHOPS AND PLANTS WITH DIVERSIFIED, SMALL-RUN JOBS

No longer is Carboloy milling confined to large, quantity-production jobs. This new, general-purpose cutter (standard 5-inch diameter with 12 Carboloy blades) can be used universally on all types of cast iron, non-ferrous metals and non-metallic materials just the same as your ordinary tool-crib cutter. Low cost of this standard cutter assures rapid return on investment while benefiting from the many advantageous features of Carboloy milling. Special re-grinding service available at nominal cost.

Fabricated Structural Steel

Lettings Decline—New Projects Also Lower

ALTHOUGH the bulk of awards was in small tonnages, lettings totaled 15,800 tons compared with 25,800 tons last week and 22,350 tons two weeks ago. Among the largest awards were 2300 tons for tunnel ribs for the Metropolitan Water District, Los Angeles, 2250 tons for the Government flying field at Middletown, Pa., and 1315 tons for the Fifth Regiment Armory in Baltimore. New projects of 15,800 tons compare with 16,310 tons in the previous week and include 3300 tons for contract No. 3 for the subway approach to the Camden-Philadelphia bridge, 2000 tons for transmission towers at Knoxville, Tenn., and 2000 tons for the Parker Dam on the Colorado River in Colorado, on which bids will be taken about July 1. Plate awards total 6450 tons. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Canton, Me., 400 tons, State highway bridge, to Pittsburgh-Des Moines Steel Co.

New York, 240 tons, contract No. 14 for Tri-Borough Bridge, to American Bridge Co.

Flushing, L. I., 145 tons, department store, to Mott Haven Iron Works.

Rochester, N. Y., 630 tons, John Marshall High School, to F. L. Heughes & Co.

Jamestown, N. Y., 210 tons, Industrial Arts building, to McClintic-Marshall Corp.

Fulton, N. Y., 175 tons, building, to Empire Structural Sales Co.

Middletown, Pa., 2250 tons for Government flying field, to Belmont Iron Works.

Bedford, Pa., 125 tons, addition to high school, to Guibert Steel Co.

Baltimore, 1315 tons, Fifth Regiment Armory, to McClintic-Marshall Corp.

SOUTH AND SOUTHWEST

Richmond, Va., 380 tons, building for Kolb's Bakery Co., to Richmond Structural Steel Co.

Fort Meyer, Va., 370 tons, Government riding hall, to Lehigh Structural Steel Co.

Langley Field, Va., 700 tons, Back River bridge, to McClintic-Marshall Corp.

Lake Powell, Fla., 350 tons, toll bridge, to McClintic-Marshall Corp.; George D. Auchter Co., general contractor.

State of Florida, 900 tons, bridge over Ouchita River, to McClintic-Marshall Corp.

Crawford County, Ark., 375 tons, bridge, to J. B. Klein Iron & Foundry Co.

State of Arkansas, 125 tons, bridge, to Arkansas Foundry & Machine Co.

Lampasas County, Tex., 145 tons, bridge, to Fort Worth Steel & Machinery Co.

Atcheson, Topeka & Santa Fe Railway, 160 tons, bridge at Clovis, N. M., to McClintic-Marshall Corp.

CENTRAL STATES

Cleveland, 270 tons, Erie grade crossing elimination at North Randall, to Fort Pitt Bridge Works Co.

Franklin County, Ohio, 370 tons, bridge trusses, to Pan American Bridge Co.

Shelby County, Ind., 155 tons, bridge, to Central States Bridge & Structural Co.

Marshall County, Iowa, 185 tons, beam spans, to Des Moines Steel Co.

Allamakee County, Iowa, 240 tons, beam spans, to Vierling Steel Works.

Baltimore & Ohio Railroad, 190 tons, terminal at Riverdale, Ill., to American Bridge Co.

Sangamon County, Ill., 145 tons, highway bridge, to McClintic-Marshall Corp.

Starks, Ill., 200 tons, over head crossing, to American Bridge Co.

Wabash Railroad, 275 tons, bridges, to American Bridge Co. and McClintic-Marshall Corp.

Red Wing, Minn., 100 tons, building, to Lakeside Steel & Bridge Co., Milwaukee.

Duck Creek, Wis., 100 tons, over head crossing, to American Bridge Co.

WESTERN STATES

Healdsburg, Cal., 150 tons, County bridge, to Judson-Pacific Co.

El Segundo, Cal., 105 tons, buildings, to Pacific Iron & Steel Co.

Los Angeles, 170 tons, Latijera Boulevard viaduct, to Consolidated Steel Corp.

Los Angeles, 500 tons, alterations to Bullock's department store, to Consolidated Steel Corp.

Los Angeles, 600 tons, tunnel supports for Metropolitan Water District, to McClintic-Marshall Corp.

Los Angeles, 2300 tons, tunnel ribs for Metropolitan Water District, to Commercial Shearing & Stamping Co.

North Bend, Ore., 350 tons additional, Coos Bay bridge, to Virginia Bridge & Iron Co.

Seattle, 180 tons, University of Washington library addition, to Isaacson Iron Works.

Olympia, Wash., 180 tons, addition to University of Washington library building, to Isaacson Iron Works.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Wellesley, Mass., 200 tons, physics and chemical building.

Newburyport, Mass., 125 tons, highway and two bridges.

Westboro, Mass., 100 tons, State Hospital Nurses' Home.

Woburn, Mass., 750 tons, glue factory for New England Chemical Industries.

New York Central Railroad, 900 tons, Willow Avenue viaduct at Hoboken, N. J.

Allegany, N. Y., 845 tons, grade crossing elimination for Erie Railroad.

Hamburg, N. Y., 285 tons, grade crossing elimination for Erie Railroad.

Camden, N. J., 1000 tons sheet piling, contract No. 3 for subway approach to Camden-Philadelphia bridge; bids June 1 on general contract.

Camden, N. J., 3300 tons, contract No. 3 for approach subway to Philadelphia-Camden bridge.

Loreley, Md., 340 tons, Gunpowder River bridge.

THE SOUTH

Knoxville, Tenn., 2000 tons, transmission towers at Wilson Dam.

Fredericksburg, Va., 375 tons, bridge.

Milledgeville, Ga., 275 tons, bridge.

Fort Worth, Tex., 825 tons, viaduct.

Milton, Fla., 140 tons, State highway bridge over Yellow River.

CENTRAL STATES

State of Ohio, 150 tons, Warren County bridge; bids May 25.

Frankfort, Mich., 100 tons sheet piling, Coast Guard station, to Kalman Steel Corp.

State of Illinois, 1200 tons, highway bridges; bids to be taken May 27.

Winneconne, Wis., 700 tons, Wolf River draw span; bids about June 15.

Milwaukee, 1000 tons, sheet piling for revetment for filtration plant site; Stein Construction Co., Milwaukee; low bidder on revised plans.

State of Minnesota, 1000 tons, bridge.

WESTERN STATES

Fort Peck, Mont., 150 tons, towers and substation, United States Engineer Office.

Denver, 2000 tons, Parker Dam on Colorado River below Boulder Dam; bids about July 1.

Southern Pacific Railroad, 700 tons, bridges in California and Oregon; bids under advisement.

Port Angeles, Wash., 100 tons, seaplane hangar for Coast Guard; George Hess, low bidder.

Bonneville, Ore., 1000 tons, sheet piling, dam; bids late this month.

FABRICATED PLATE

AWARDS

Marcus Hook, Pa., 1060 tons, roof tanks for Sinclair Refining Co., to McClintic-Marshall Corp.

East Chicago, Ind., 1025 tons, two 93,000-bbl. tanks for Sinclair Refining Co., and a third tank of same capacity for Sinclair company in Pennsylvania, to Chicago Bridge & Iron Works.

Richmond, Va., 250 tons, municipal tank, to Stacey Brothers.

Dallas, Tex., 360 tons, elevated tank, to Pittsburgh-Des Moines Steel Co.

Monte Vista, Colo., 1250 tons, pipe line, to Thompson Mfg. Co.

Los Angeles, 2500 tons, tunnel liners for Metropolitan Water District, to Commercial Shearing & Stamping Co.

NEW PROJECTS

Waukesha, Wis., 125 tons, water storage tank; Roberts & Schaefer Co., Chicago, low bidder.

Ogden, Utah, 500 tons, Pineview Dam pipe line; bids about June 15.

Denver, 500 tons, Parker Dam on Colorado River below Boulder Dam; bids about July 1.

Washington, 196 tons, material for West Coast yards; bids under advisement.

Pig Iron and Scrap Dull In New England

BOSTON, May 15.—Pig iron sales are few and in small lots. The aggregate was the smallest in many weeks. Troy furnace representatives have been canvassing the foundry trade, more particularly in western Massachusetts. The Troy furnace was blown in May 4 following a long period of idleness. No inquiries of size are in the market.

The scrap market is featureless except for the movement of a little No. 1 and No. 2 steel for export. Following the withdrawal of Pennsylvania steel mills from the market, the American Steel & Wire Co., Worcester, Mass., dropped its price on No. 2 steel to a basis in which shippers are not interested. Early last week there were offers of \$2.80 on cars for steel turnings, but now these have been withdrawn. Prices for most grades of scrap have been reduced 25c. a ton on the average, but they are not really established because of the lack of sales.

Machinery Products Group Elects Code Authority Members

FUTURE plans for organized effort in the machinery industry were outlined at a meeting of the Machinery and Allied Products Institute held at the Hotel Cleveland, Cleveland, May 14 and 15. The institute is a federation of the machinery interests of the country and was organized early last summer to meet problems arising from the National Recovery Act. It now has a membership of 59 trade associations and 1000 leading manufacturers of machinery. There was a registered attendance of 350 at the meeting representing manufacturers of almost all lines of machinery.

The morning session was a meeting of the institute and this was followed in the afternoon by a meeting of the Machinery and Allied Products industry. John W. O'Leary, president of the institute, presided. He submitted a report covering the activities of the year and its rapid growth.

Robert Gaylord, Ingersoll Milling Machine Co., Rockford, Ill., as chairman of the institute program committee, outlined the future plans for the institute. There is a great need, he declared, for a selected group to concentrate on the specific interests of machinery manufacturers. He felt that it had been demonstrated that some measures are too broad to be handled by a single group, but others are of vital importance to a group composed of machinery interests.

Among the activities of the machinery group during the year, he said, was an educational campaign conducted against the anti-machine movement, and one of the crowning activities was the segregation for the NRA of the manufacture of consumer and durable goods. He pointed out that while all machinery manufacturers are making durable goods, not all makers of durable goods are machinery manufacturers. However, both interests should cooperate to present a solid front, as has been done by the durable goods organization of the NRA. The institute should be the rallying organization of the numerous trade associations affiliated with it and should be continued on a more extensive basis.

Some of the activities of the institute in respect to the durable goods industry were outlined by George H. Houston, Philadelphia, president Baldwin Locomotive Works.

During the afternoon meeting of the Machinery and Allied Products industry A. R. Glancy, divisional administrator of the NRA, gave a talk devoting his attention mostly to the durable goods industries.

A formal dinner was held at night at which the speakers were George H.

Houston and Col. Leonard P. Ayres, statistician, Cleveland Trust Co., Cleveland.

The program during the second day was confined to group meetings which were held by 28 associations affiliated with the Machinery and Allied Products Institute. Each group devoted the day to discussion of the problems peculiar to its own industry.

The institute elected the following new executive committee of 15 members to serve for the ensuing year:

EXECUTIVE COMMITTEE

P. C. Brooks, executive vice-president, Fairbanks, Morse & Co., Chicago.
W. C. Dickerman, president, American Locomotive Co., New York.
Robert E. Friend, president, Nordberg Mfg. Co., Milwaukee, Wis.
Robert M. Gaylord, president, Ingersoll Milling Machine Co., Rockford, Ill.
Leo W. Grothaus, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
George H. Houston, president, Baldwin Locomotive Works, Philadelphia.
D. C. Keefe, executive vice-president, Ingersoll-Rand Co., New York.
A. M. Mattison, president, Mattison Machine Works, Rockford, Ill.
C. S. Searle, executive vice-president, Worthington Pump & Machinery Corp., Harrison, N. J.
Harold C. Smith, president, Illinois Tool Works, Chicago.
George P. Torrence, president, Link-Belt Co., Chicago.
C. S. Wagner, vice-president, Koehring Co., Milwaukee, Wis.
Philip M. Morgan, president, Morgan Construction Co., Worcester, Mass.
M. F. Dunne, president, Pyott Foundry & Machine Co., Chicago.
Guy A. Wainwright, president, Diamond Chain Mfg. Co., Indianapolis.

The following were elected as members of the basic code authority for the Machinery and Allied Products industry:

W. S. Shipley, York Ice Machinery Corp., York, Pa.
W. C. Dickerman, American Locomotive Co., New York.
Leo W. Grothaus, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Paul C. De Wolf, Brown & Sharpe Mfg. Co., Providence, R. I.
P. C. Brooks, Fairbanks, Morse & Co., Chicago.
George P. Torrence, Link-Belt Co., Chicago.
N. W. Pickering, Farrel-Birmingham Co., Ansonia, Conn.
Robert E. Friend, Nordberg Mfg. Co., Milwaukee, Wis.
George H. Houston, Baldwin Locomotive Works, Philadelphia.
A. M. Mattison, Mattison Machine Works, Rockford, Ill.
Guy A. Wainwright, Diamond Chain Mfg. Co., Indianapolis.
Denis F. O'Brien, A. P. Smith Mfg. Co., East Orange, N. J.

No Fee to Be Assessed On Trucks "Not For Hire"

WASHINGTON, May 15.—The proposal to assess a fee of 90c. per vehicle for registering trucks "not for hire" has been "indefinitely" postponed.

Among protestants was the Machinery and Allied Products Institute. The fee was to constitute part of a budget of the national code authority for the trucking industry. The administrator approved a \$3 assessment for all trucks operating "for hire." It is believed the "indefinite" postponement of the 90c. fee for trucks "not for hire" will be made permanent.

NON-SHRINK, OIL HARDENING TOOL STEEL TUBING



The job of making ring dies, cutting dies, bushings spacers, etc., is half done when you start with Bissett Tool Steel Tubing. There is a size carried in stock to meet every requirement up to 12" O.D. and 2" wall thickness. Larger sizes can be supplied.

It eliminates forging, does away with annealing difficulties and cuts down machining cost.

We also supply special tubing to S.A.E. 52100 and S.A.E. 4615 analysis for Ball Bearing purposes.

Manufacturers of BISCO Tungsten Carbide and Tantalum Carbide drawing dies for wire, rod and tubing.

THE BISSETT STEEL CO., INC.

945 E. 67th STREET, CLEVELAND, O.

Cincinnati

Worcester

Buffalo

Metallurgists Debate Merits of Alloying Elements

(Concluded from Page 27)

creases without proportionately great decreases of ductility.

In general, nickel retards the reaction rates during heat treatment, thereby permitting mild quenching and depth hardening. This quality is shown in Fig. 3 wherein data are given showing a comparison of the critical cooling rates of carbon and 3 per cent nickel steels. The steel will harden more deeply as the critical rate is lowered.

The influence of nickel in promoting a resistance to grain growth has been known for some time. In addition, correct Ni proportions refine the steel structure and through this refinement the mechanical properties are considerably improved.

In high-carbon tool steels certain proportions of Ni promote the retention of some austenite, whereby the steel is given a greater resistance to fatigue at high hardness.

Nickel also greatly alters the dissolving power of iron for other materials, and, thereby, it can provide, on one hand, steels which are age-hardening (for example Ni-Al steels) and, on the other hand, it can provide steels which resist aging embrittlement. As a corollary to this, it may be stated that Ni also improves low-temperature toughness values of steels.

However, probably the outstanding effect of a Ni addition is its ability to toughen iron and iron-carbon (such as ingot iron) alloys. This toughening is reflected in improved fatigue resistance in both normalized and the quenched and tempered steels. Ni also toughens the cases of nitrified steels, and toughens rustless steels by converting (high-chrome type) them into an austenitic condition which results in steels having superior deep-drawing properties. The general effect of small amounts of retained austenite on the fatigue resistance of hardened and high-carbon steels is shown by the data presented in Fig. 4.

Effects of Molybdenum

Dr. Gillett brought out that molybdenum steels have been a comparatively recent development as their general use dates back only 15 years, at which time the Bureau of Mines was especially interested in Mo as a domestic material of value in time of war. Schneider worked on and patented Cr-Mo steel around 1895, and Swinden studied C-Mo steels in England around 1910, but the real introduction of Mo steels to industry came in America during the period 1915-1920, chiefly because of the work of the Ford Motor organization.

Molybdenum is soluble in ferrite, and is also a strong carbide former. Therefore, it may be expected to exert an influence on Fe-C alloys in various directions. In an annealed C steel reasonable amounts of Mo do not exert a striking effect, and in the normalized condition the effect is also not very marked. It has, however, one very specific use and that is to increase strength at high temperatures. This quality is utilized abroad in boiler tube steel for Loeffler boilers. Aside from this there is very little commercial use of plain C-Mo steel, although there is a real dearth of information upon this material considering it is the base of all Mo-containing steels.

The Mo effect in heat-treated steels is much more marked than in the untreated. About 0.75 per cent of Mo in carbon steel materially lowers the critical point on cooling and it becomes almost air hardening. This effect is still more pronounced in the presence of other alloying elements.

A pinch of Mo lowers the critical rate of cooling for hardening in a low alloy Cr, Mn or Ni steel more than several times the amount of any one of the other elements. Commercially about 0.20 to 0.30 per cent Mo is now thought desirable for intensifying the effect of other alloying agents.

Mo produces remarkable depth hardening on quenching and makes the steel resistant to softening on tempering. The higher draw temperature tends toward better relief of quenching stresses, and this reluctance to tempering is consistent with its behavior in conferring high temperature strength.

The Cr-Mo combination has been found especially adapted to aircraft tubing as the air hardening tendency is just sufficient to produce good properties following the welding of thin sections.

Mn bolstered up by a little Mo makes a Mn-Mo combination which sometimes supplants more expensive steels. The Bonney-Floyd Co. uses Mn-Mo steel for quenched and tempered steel castings of very intricate shapes and sections. The recent United States Navy tests have also shown good results on high Mn steels with Mo for use in forgings.

Another binary steel is Ni-Mo which is a standard for ball and roller bearing races. It can be hardened to 800 Vickers Brinell. The Mo-V combination is not widely used, but it has been found particularly suitable for centrifugally cast guns. The English standard for big guns is a Ni-Cr-Mo combination which is also finding use

for extrusion rams operating on hot material at a load of 110,000 lb. per sq. in.

Dr. Gillett pointed out the current tendency for the reduction of Ni, Cr, and other element percentages and replacing them with Mo. The Mo accentuates the alloying effects of Ni and Cr, and it removes or greatly reduces the tendency toward temper brittleness and improves temperature stability.

For extreme strength the Ni-Cr-Mo-V combination is often used. This steel can be tailor-made for almost any combination of properties.

As to cost, Dr. Gillett stated that 0.3 per cent Mo costs about the same as 1 per cent Ni or around 0.1 per cent V. Since Mo is easily reduced, it can often be utilized as calcium molybdate instead of as ferro, and it is not slagged out on remelting as are Cr and V, but resembles Ni and Cu in this respect. Mo adds no complications to steel making or casting practice, and, in addition, there is a great quantity of domestic Mo available.

Molybdenum is finding a place in high-test cast iron where it makes for better strength, hardness, and wear resistance without ruining the machineability. It produces smaller and better distributed graphite flakes and has value for producing uniformity of properties in large sections. There is a possibility that it may find a use in malleable iron.

In complex alloys it is quite generally used in nitriding steels and sometimes in austenitic steels. Both Cu and Mo together have shown definite advantages in the 18-8 type, but the action is still very obscure and needs clarification.

The feasibility of substituting 9.5 per cent Mo for 18 per cent W in high-speed steel has been demonstrated for some uses at Watertown Arsenal. A retention of a little W in a Mo high-speed steel is also desirable for drills, and Mo hack saw blades are finding increasing favor.

In concluding his discussion, Dr. Gillett showed that in 5 per cent Cr and 0.5 per cent Mo oil still tubes, the Mo is more effective and hence more economical than W in conferring creep resistance. It is not yet clear whether this action is true in very highly alloyed austenitic steels, but its study deserves and is receiving considerable attention.

To Build Large Cranes for Boulder Dam

(Concluded from Page 14)

type, having a span of 64 ft. and a lift of 70 ft. The eight electric motors employed in the bridge drive, the hoist and hoist propel mechanisms, are the company's special crane type and have a combined output of 380

h.p. for and construction

After cranes for 150-ton Colorado units to approach of the

Two installed house generator of 26 600 ton ing su Westingh manufact with Althoug generat at pres of the p h.p.

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Plant Equip

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Higashi Mukden, nese rays Spinning local Mit cession f tract of t

h.p. for each crane. Truck bodies and trolley frames are to be of welded construction.

After shop erection and test the cranes will be completely dismantled for shipment to Boulder Dam. A 150-ton cable-way which spans the Colorado Canyon will lower the huge units to the floor of the power house, approximately 600 ft. below the brink of the canyon.

Two of the 300-ton units will be installed in each wing of the power house for handling of the huge generator rotors, which have a diameter of 26 ft. and weigh approximately 600 tons each. These huge rotors being supplied by General Electric, Westinghouse and Allis-Chalmers manufacturing companies are credited with being the largest ever built. Although only four of these huge generating rotors are to be installed at present time, the ultimate output of the power plant will exceed 115,000 h.p.

The 50-ton crane will be installed in the Boulder Dam power house for miscellaneous work in connection with fabricating structures that are too large to permit shipment and installation after being built up.

Sale of a large dragline excavator to the Iditarod Mining Corp. in Alaska is also reported by the Har-nischfeger Corp.

Plant Expansion and Equipment Buying

Kinner Airplane & Motor Corp., Inc., Glendale, Cal., manufacturer of aircraft, aircraft motors, etc., is arranging for sale of stock totaling \$199,840, part of fund to be used for expansion, including new equipment, materials, etc. W. G. Milne, Glendale, is assistant secretary and treasurer.

Lloyd G. Ham, Benica, Cal., care of Hunt, Mirk & Co., 141 Second Street, San Francisco, architect and engineer, is at head of project to erect a new distillery at first noted place. Initial unit will approximate 10,000 sq. ft. floor space. Cost about \$65,000 with equipment. A company will be organized to carry out program.

Public Utilities Commission, City Hall, San Francisco, will soon begin erection of new one-story machine shop at municipal airport (Airport Contract No. 33).

Pacific Cast Iron Fitting Co., Los Angeles, has been organized by Irwin Schulman and J. B. Goldenberg, care of Leo D. Epstein, 405 South Hill Street, representative, to manufacture cast iron pipe fittings and kindred products.

Pacific Portland Cement Co., 111 Sutter Street, San Francisco, has purchased Standard Gypsum Co., with plants at Long Beach, Cal., Ludwigs, Nev., and Seattle, and will consolidate, under direction of Martin Uldall, formerly head of acquired company. Expansion and improvements will be made.

Spokane Brewing & Malting Co., 901 Broadway, Spokane, Wash., plans three-story addition. Cost about \$40,000 with equipment. Theodore Galland is vice-president.

Higashi Manchukuo Rayon Pulp Co., Ltd., Mukden, Manchuria, recently formed by Japanese rayon manufacturers, headed by Fuji Spinning Co., Tokyo, Japan, connected with local Mitsubishi interests, has secured concession from Government of Manchuria of tract of timber land near Manchurian-Korean

border on River Tumen, and plans erection of new pulp mill for raw material supply for rayon mills interested in organization. Initial plant will include power house, machine shop, pumping plant and other mechanical departments. Cost over \$1,500,000 with equipment. Company is also securing concession for another tract of wood land near River Sungari, and plans second multi-unit pulp mill to cost close to like amount. New company is capitalized at 15,000,000 yen (about \$4,500,000).

Cork Harbour Oil Wharves, Ltd., Cork, Ireland, plans new oil refinery near Haulbowline, where site is being selected. Plant will include tank storage and distributing department, power house and other mechanical facilities, pumping station, etc. Cost over \$400,000 with equipment.

Soviet Russian Government, Moscow, plans new units for parts production and assembling in automobile works at Gorky (formerly Nizhni Novgorod), and installation of equipment. Cost close to \$1,000,000. Amtorg Trading Corp., 261 Fifth Avenue, New York, is official buying agency.

Coming Meetings

May

Porcelain Enamel Institute, May 16-17. Fourth annual meeting, Hotel Statler, Cleveland. George P. MacKnight, 612 North Michigan Avenue, Chicago, secretary.

American Iron and Steel Institute, May 24. Forty-third general meeting, Hotel Commodore, New York. L. V. Collins, 350 Fifth Avenue, New York, secretary.

American Supply and Machinery Manufacturers Association, May 22-23. Annual convention, Netherland Plaza Hotel, Cincinnati. R. Kennedy Hanson, American Bank Building, Pittsburgh, secretary.

June

American Electro-Platers' Society, June 11 to 14. Annual meeting, Hotel Statler, Detroit. T. C. Eichstaedt, Statler Hotel, Detroit, secretary.

National Association of Purchasing Agents, June 18 to 22. Annual convention and exhibition, Hotel Cleveland, Cleveland. George A. Renard, 11 Park Place, New York, secretary.

American Society for Testing Materials, June 25 to 29. Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. C. L. Warwick, 260 South Broad Street, Philadelphia, secretary.

Society of Automotive Engineers, June 17 to 22. Summer meeting, Saranac Inn, Saranac Lake, N. Y. John A. C. Warner, 29 West Thirty-ninth Street, New York, general manager.

American Society of Mechanical Engineers, June 25 to 28. Semi-annual meeting, Cosmopolitan Hotel, Denver, Colo. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

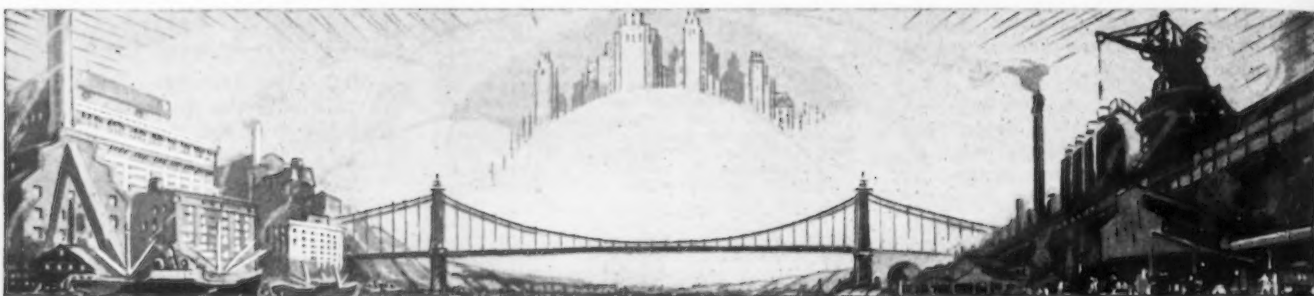
Mixed Production Trend

ALTHOUGH steel output for the country at large has advanced from 60 to 61 per cent of capacity, the trend is no longer uniformly upward. At Pittsburgh, operations rose one point from 49 to 50 per cent, at Cleveland two points from 65 to 67 per cent, and in the Valleys two points from 63 to 65 per cent. In the South there was a decline from 65 to 63 per cent, and at Buffalo there was a recession from 68 to 62 per cent. Rates are unchanged at other centers as follows: Chicago, 64 per cent; Philadelphia district, 46 per cent; Wheeling district, 79 per cent; Detroit, 100 per cent.

Steel Price Changes

AMONG new minimum base prices filed with the American Iron and Steel Institute are the following:

Product and Effective Date	Base Price, Lb.	Basing Point
Stainless Type 412, May 20.		Pittsburgh
Analysis:		
Carbon, 0.08 to 0.20		
Chrome, 12 to 15		
Silicon, 0.50 to 3.50		
Sheets	28c.	
Stainless Type 432, May 21.		Pittsburgh
Analysis:		
Carbon, 0.12 max.		
Chrome, 15 to 18		
Copper, 0.50 min.		
Silicon, 0.50 max.		
Hot-rolled strip.....	16c.	
Cold-rolled strip.....	22c.	
Slabs	11½c.	
Stainless Type 436, May 20.		Pittsburgh
Analysis:		
Carbon, 0.08 to 0.20		
Chrome, 15 to 18		
Silicon, 0.50 to 3.50		
Sheets	31c.	
Stainless Type 444, May 20.		Pittsburgh
Analysis:		
Carbon, 0.08 to 0.20		
Chrome, 18 to 23		
Silicon, 0.50 to 3.50		
Sheets	35c.	
	100 Lb.	
Cold-finished sheets, mill run, No. 20 gage, May 22	\$3.05	Pittsburgh
	Gross Ton	
Special analysis die block steel, May 24.....	\$51	Buffalo and Pittsburgh
Analysis:		
Carbon, 0.25 to 0.65		
Manganese, 0.45 to 0.90		
Chromium, 0.65 to 0.85		
Nickel, 0.30 to 1.75		
Molybdenum, 0.18 to 0.35		
	100 Lb.	
Electrical sheets, May 24.		Pacific Coast Ports
Field grade.....	\$3.75	
Armature grade.....	4.10	
Electrical grade.....	4.60	
Electrical grade (disposal)	3.70	
Motor special grade..	5.65	
Motor special grade (disposal)	4.70	
Dynamo special grade	6.35	
Dynamo special grade (disposal)	5.20	
Transformer grade...	6.85	
Transformer grade (disposal)	5.70	
Transformer special grade	7.85	
Transformer special grade (disposal)....	5.70	
Transformer extra special grade.....	8.35	
Transformer extra special grade (disposal)	5.70	
Electrical sheets coiled, May 18.		Pittsburgh
Armature grade A...	3.40	
Armature grade B...	3.30	
Field grade.....	3.05	
Electrical grade....	3.90	
Electrical grade (disposal)	3.00	
Special motor grade..	4.95	
Special motor grade (disposal)	4.00	
Special dynamo grade	5.65	
Special dynamo grade (disposal)	4.50	
Transformer grade...	6.15	
Transformer grade (disposal)	5.00	
Transformer special grade	7.15	
Transformer special grade (disposal)....	5.00	
Transformer extra special grade.....	7.65	
Transformer extra special grade (disposal)	5.00	



PLANT EXPANSION AND EQUIPMENT BUYING

Business Uncertainty Checks Machine Tool Orders—Export Demand Better

GROWING uncertainty regarding the trend of general business activity and increasing labor unrest are beginning to have unfavorable effect on machine tool demand. This is particularly noticeable in the automobile industry where substantial retooling programs are being held up. While there is no doubt that the automotive group will have to buy heavily before the end of the year, the prospect of purchases in the near future has disappeared.

Machine tool demand from other sources is less active. Purchases of single tools are not uncommon and repair parts are moving in good volume. Builders have accumulated fair backlogs and plants are engaged at a good rate in most instances.

Export demand is a more important factor than has been the case for some time. Germany has recently placed a substantial order with a Cleveland company and other makers are engaged on orders from Russia and England. Inquiry from abroad is also reported to be heavier, although developments in connection with the debt situation may tend to halt business.

◀ NEW ENGLAND ▶

Draper Corp., Hopedale, Mass., manufacturer of textile machinery and parts, has let general contract to Casper-Ranger Construction Co., Holyoke, Mass., for three-story addition, 140 x 600 ft. Cost over \$400,000 with equipment. F. P. Sheldon & Sons, Providence, R. I., are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 22 for one motor-driven cylinder grinding machine (Schedule 2483) for Portsmouth, N. H., Navy Yard.

Atlas Machinery Co., Inc., Waterbury, Conn., has been organized by Samuel and Louis Rosenbaum, 36 Kingsbury Street, to manufacture machinery and parts.

Torrington Co., Torrington, Conn., manufacturer of ball bearings, swaging machinery, small steel and metal specialties, etc., has let general contract to Torrington Building Co., 182 Church Street, for one-story addition, 50 x 225 ft. Cost over \$60,000 with machinery.

Gilman Paper Co., Gilman, Vt., has let general contract to J. H. Taylor Construction Co., 31 Union Square, New York, for one-story addition for storage and distribution. Cost about \$35,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for new one and two-story factory branch, storage and distributing plant at Bridgeport, Conn., 88 x 174 ft. Cost about \$30,000 with equipment.

◀ NORTH ATLANTIC ▶

Titanium Pigment Co., 111 Broadway, New York, has let general contract to Wigton-Abbott Corp., 143 Liberty Street, for new plant at Sayreville, N. J., fronting on Raritan River. Group of 11 buildings will be erected, including acid works, filtration plant, mechanical-drying unit, power house, machine shop and other structures. Cost about \$2,500,000 with machinery. A. S. Moses is vice-president and general manager.

Preferred Oil Co., Inc., 95 Frost Street, Brooklyn, plans new bulk oil storage and distributing plant on East River waterfront. Cost about \$80,000 with tanks, pumping machinery and other equipment.

Al-Cla-Ne Mfg. Co., Inc., Scotia, N. Y., has been organized by Clarence H. Wilkes, 122 Mohawk Avenue, and Alvin C. Spitzer, 107 Mohawk Avenue, to manufacture special machinery and parts.

American Smelting & Refining Co., 120 Broadway, New York, plans extensions and improvements in plant at Garfield, Utah, including new stack and equipment. Work will be carried out during summer. Cost about \$125,000. W. J. O'Connor is manager of Utah division.

Cross, Austin & Ireland Lumber Co., 1246 Grand Avenue, Brooklyn, plans new bulk oil storage and distributing plant fronting on Newtown Creek. Cost over \$75,000 with tanks, pumping machinery and other equipment.

Board of Education, Haverstraw, N. Y., plans manual training department in new multi-story school, for which bids will soon be asked on general contract. Fund of \$690,000 has been secured through Federal aid. Knappe & Morris, 192 Lexington Avenue, New York, are architects.

Signal Supply Officer, Army Base, Brooklyn, asks bids until May 28 for 2000 pliers (Circular 106); until May 29 for receiving equipment (Circular 109).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 22 for two winches and spare parts (Schedule 2500-R); until May 29, 150 wire sectional boiler-tube brushes, 3900 wire boiler-tube brush sections and 1420 wire boiler-tube brush sets (Schedule 2478) for Brooklyn Navy Yard; until May 22, axes, hammers, hatchets, sledges, mallets, etc. (Schedule 2449), countersinks and reamers (Schedule 2465), hacksaws, miter box saws, crosscut saws, keyhole saws, rip saws, etc. (Schedule 2450), for Brooklyn and Sewall's Point yards.

Riddell Stoker Corp., New York, has been organized by Elliot H. Greene, 161 West

Seventy-fifth Street, and associates, to manufacture stokers, parts, etc.

duPont Rayon Co., 350 Fifth Avenue, New York, has approved plans for new multi-story units at mill at Amptill, near Richmond, Va. Cost over \$4,000,000 with machinery. Company will also carry out similar expansion at branch mill at Waynesboro, Pa. Cost about \$2,500,000 with equipment.

Sunrise Metal Stamping & Die Works, Inc., New York, has been organized by George Galante, 2149 East First Street, Brooklyn, and associates, to manufacture metal stampings, metal devices, etc.

United Cork Co., Lyndhurst, N. J., is considering rebuilding part of plant recently destroyed by fire; other plants in immediate vicinity, damaged by same fire, also propose early rebuilding, including Leslie Valve Co., J. M. Lehmann Machinery Co., and M. J. Merkin Paint Co. Entire loss over \$250,000 with equipment.

New York Wire Cloth Co., Market Street, York, Pa., with headquarters at 500 Fifth Avenue, New York, plans one-story addition, 110 x 180 ft. Cost over \$50,000 with equipment. R. A. Stair, Guardian Trust Building, York, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 22 for motor-driven keyway cutter machine (Schedule 2482) for Philadelphia Navy Yard.

Nash Philadelphia Co., 2917 North Sixteenth Street, Philadelphia, representative for Nash automobile, has leased five-story building at Broad and Thompson Streets, over 60,000 sq. ft. floor space, for new headquarters and will install machine repair shop and service department.

School Board, Administration Building, Reading, Pa., has plans for two-story and basement and sub-basement junior high school, 360 x 460 ft., to include manual training department. Cost about \$1,500,000 with equipment. Associated Architects, 147 North Fifth Street, are architects.

◀ BUFFALO DISTRICT ▶

Swift & Co., Elmira, N. Y., meat packers, with central district offices at 25 Faneuil Hall Square, Boston, plans new two-story and basement storage and distributing plant, 78 x 125 ft., at Elmira. Cost over \$50,000 with equipment. A. E. Bump, Boston office noted, is engineer.

Harnden Machine Co., Inc., Pulaski, N. Y., has been organized by John L. Harnden and Roy Sanderson, Pulaski, to manufacture machinery and other mechanical equipment, etc.

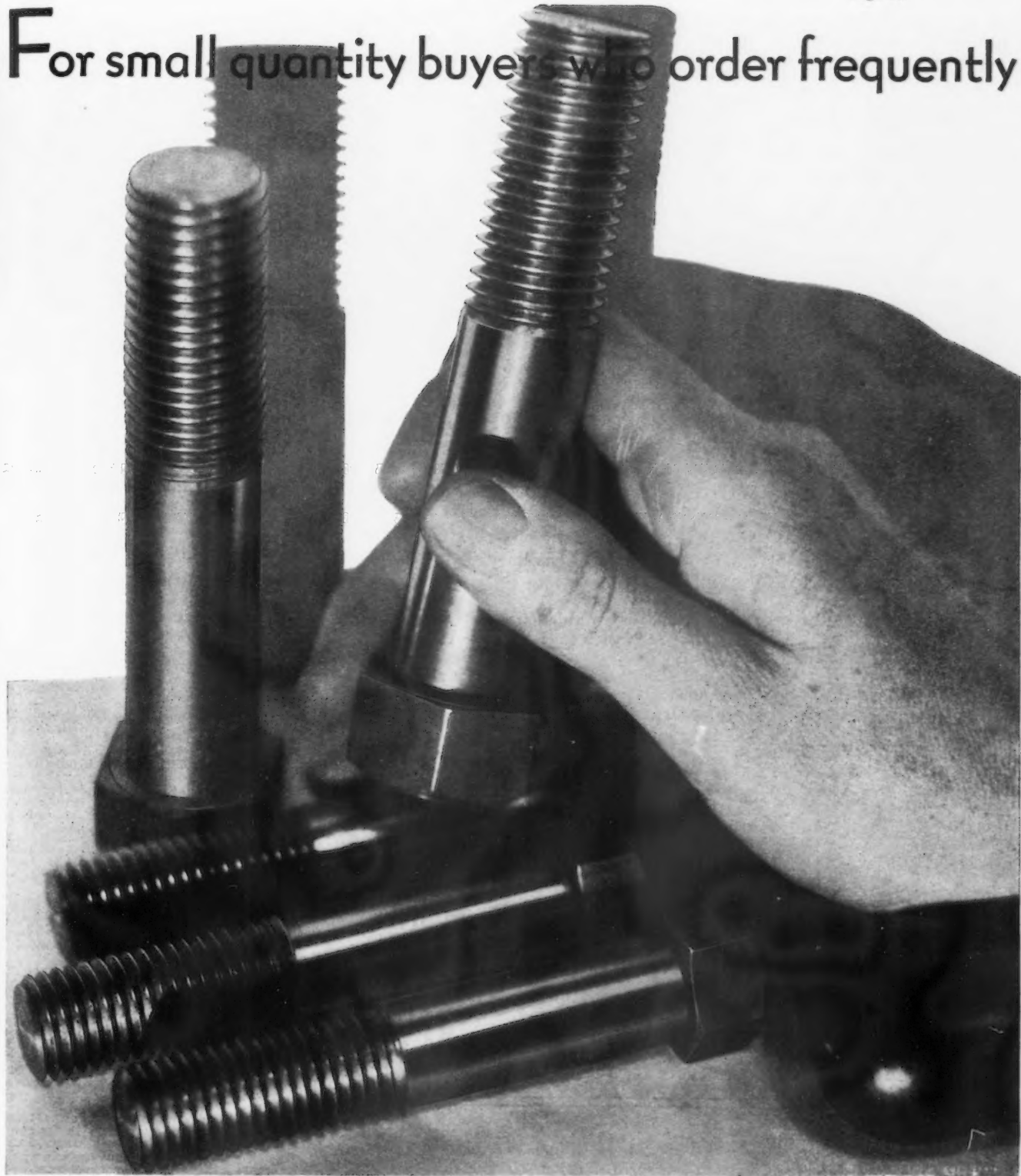
Village Council, Vernon, N. Y., asks bids until May 24 for pumping equipment, 200,000-gal. elevated steel tank and tower, 3½ miles pipe lines, etc., for municipal water system. William T. Field Engineers, Inc., Watertown, N. Y., is engineer.

◀ WESTERN PENNA. ▶

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, food packer, has plans for multi-story addition to branch plant at Leamington, Ont. Cost over \$85,000 with equipment. Other new units will be built later with ultimate cost over \$200,000.

West Virginia Steel Corp., Charleston, W. Va., recently organized, will take over iron and steel works of R. J. Coney & Co., Fourth Avenue. Extensions and improvements are planned. F. A. Prince heads new organization.

For small quantity buyers who order frequently



WE, TOO, buy some materials in small quantities . . . *and often*. In our plant, too, we want a small order delivered without delay. So we know how it is when you want just a few thousand cap screws, *and want them now*. To provide for just that kind of service to our customers we maintain a stock of 30 million Cleveland Cap Screws at our five warehouses and the factory . . . in a complete list of sizes, fine and coarse

threads, packed ready for immediate shipment. All are full finished, and made by the Kaufman Method, *patented*, an extrusion process developed in our own plant which makes a better cap screw.

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Water costs are cut 70%—maintenance costs are lowered—and skin affections reduced in thousands of plants by reason of the sanitary features of Bradley Washfountains and Group Showers.

Cost Little to Install in Old or New Building

Only three plumbing connections are needed for Bradley Washfountains and Showers.

3, 6 or 10 Wash at One Fountain

Use no more water than one person at a faucet.

3 or 5 Men in Shower Unit

The group idea again effects economies in both installation and maintenance.

There is a Bradley Fixture for Every Group Washing Requirement and for Every Budget.

Ten people at one 54-in. circular Washfountain use but a trifle more water than one person at a faucet. The Group Shower provides similar economies of water consumption. Each requires but three plumbing connections.

The savings in water, also fuel to heat the water and in maintenance are experienced continuously.

Take Advantage of These Savings Now

The sooner you install Bradleys—the greater your savings will be . . . and you will be providing washing fixtures favored by hundreds of thousands of employees in plants of every kind and size. Let us send you the names of some typical users and our Bulletin B66. BRADLEY WASHFOUNTAIN CO., 2239 W. Michigan St., Milwaukee, Wis.

BRADLEY WASHFOUNTAINS and SHOWERS

Common Council, New Cumberland, W. Va., plans installation of pumping machinery and auxiliary equipment, pipe lines, etc., for municipal waterworks. A fund of \$63,000 is being arranged. J. Paul Blundon, Keyser, W. Va., is consulting engineer.

Homer Laughlin China Co., Newell, W. Va., has begun expansion and improvements at No. 5 plant, including new tunnel kiln units, conveyors and other machinery. Cost about \$200,000 with equipment.

OHIO AND INDIANA

Board of Public Works, Columbus, Ohio, has revised plans for extensions and improvements in municipal electric light and power plant, to include new electric generating unit, condenser and auxiliary equipment, two water-tube boilers, pumps and accessories. Entire project will cost close to \$1,000,000.

Premier Rubber Mfg. Co., 1 Edmund Street, Dayton, Ohio, manufacturer of hard rubber

goods, etc., has let general contract to Walter E. Boren, 330 Grand Avenue, for one and two-story addition, and improvements in present mill. Cost over \$25,000 with equipment. Geyer & Neuffer, Arcade Building, are architects.

Rotary Cutters, Inc., Cleveland, has been organized by R. L. Alexander and D. N. Olson, represented by E. C. Tremayne, 18419 Winslow Road, to manufacture rotary cutters and other mechanical cutting equipment.

Board of Public Affairs, Bryan, Ohio, plans extensions and improvements in municipal electric light and power plant, including new engine and accessories. Cost about \$60,000.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until May 21 for 104 engine-driven vacuum pumps (Circular 551); until June 4, two-engine bombardment airplanes, in lots of 50 to 120 (Circular 538).

E. Kahn's Sons Co., 3241 Spring Grove Avenue, Cincinnati, meat packer, plans one-story addition. Cost over \$60,000 with equipment.

Fred W. Garber, 616 Walnut Street, is architect.

James Walsh & Co., Lawrenceburg, Ind., distillers, have awarded general contract to Hillsmith & Co., 108 East Third Street, Dayton, Ohio, for new multi-unit distillery. Cost over \$350,000 with machinery.

Merchants Distilling Co., Terre Haute, Ind., has approved plans for extensions and modernization, including new equipment. Cost over \$45,000 with machinery. A. J. Hoffman is president. Walter C. Wagner, Breslin Building, Louisville, is architect.

SOUTH ATLANTIC

City Council, Thomasville, N. C., asks bids until May 25 for one 1,000,000-gal. elevated steel water tank and tower, with fittings, valves, etc. William C. Olsen, Raleigh, N. C., is consulting engineer.

Mackay Radio & Telegraph Co., 67 Broad Street, New York, plans new radio telegraph station at Atlanta, Ga. Cost over \$50,000 with equipment.

Gaston Electroplating Co., Gastonia, N. C., has been organized, capital \$100,000, by Alfred S. Robinson and A. J. Roach, both Gastonia, to operate an electroplating and metal-finishing works.

Construction Quartermaster, Fort Benning, Ga., asks bids until May 22 for new underground electric distributing system and equipment.

MICHIGAN DISTRICT

Ekhardt & Becker Brewing Co., Orleans and Winder Streets, Detroit, plans six-story and basement addition. Cost close to \$100,000 with equipment. Paul Tilds, 2539 Woodward Avenue, is architect.

Sebewaing Brewing Co., Sebewaing, Mich., plans addition for storage and distribution, and will also make improvements in present plant. Company has arranged for increase in capital from \$150,000 to \$225,000, a considerable part of fund to be used for purpose noted.

Escanaba, Iron Mountain & Western Railroad, Escanaba, Mich., plans installation of traveling cranes, hoists, conveyors and other mechanical handling equipment in connection with new ore dock at North Escanaba. A fund of \$3,500,000 has been secured for project through Federal aid.

Lowry Mfg. Co., 2358 National Bank Building, Detroit, has been organized by LeRoy Lowry and associates, to manufacture machinery and parts.

WASHINGTON DISTRICT

Procurement Officer, Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until June 5 for one electric furnace (Circular 73).

Hunter, Gwynnbrook Distilling Corp., Owings Mills, Md., recently formed to take over Gwynnbrook distillery, has leased two-story building at 642 West Pratt Street, Baltimore, for new blending, rectifying and bottling works. Talbot O. Freeman is vice-president in charge of operations.

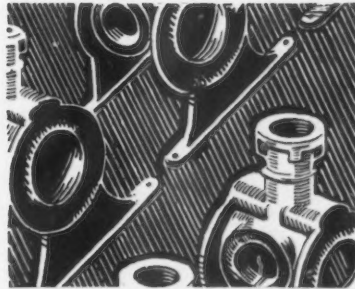
General Purchasing Officer, Panama Canal, Washington, asks bids until May 21 for equipment for hydraulic grader (Schedule 2954); until May 22, one hand-operated winch, anchor and chain shackles, turnbuckles, bolts, nuts and washers, three switchboards, etc. (Schedule 2962); until May 24, gear, chain and wire rope lubricants (Schedule 2963).

Prince George Brewing Co., Union Trust Building, Washington, Henry A. Seay, head, plans early purchase of equipment for new brewery at Laurel, Md., for which superstructure will soon begin. Cost over \$400,000 complete. Leon Chatelain, Jr., 726 Jackson Place, N. W., Washington, is architect; James Posey, Baltimore Trust Building, Baltimore, is consulting engineer.

Board of District Commissioners, District Building, Washington, asks bids until May 29 for 350,000 unfinished steel automobile license plates (above 35,000 sheets, 12½ x 61 in.).

Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 22 for one motor-driven toolmakers' precision lathe (Schedule 2495-R), 19,000 lb.

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THE protection of the Gray Iron Foundry Code gives your foundryman the opportunity for which he has waited—that of throwing all his effort into producing better castings. With your co-operation he can give you a far better casting. When he suggests 15% to 20% of pure charcoal pig iron in the mix for your work, he does so to assure accurate control of carbon and other elements necessary to greater strength, better machinability and longer casting service life.

There are definite metallurgical reasons for this quite evident in a microscopic examination of pure charcoal pig iron. Give your foundryman a chance to help you save on your machining costs and at the same time add appreciably to the strength and service life of your castings.

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SUPERIOR CHARCOAL IRON COMPANY

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DEBEVOISE-ANDERSON CO., INC., Eastern Representative
NEW YORK BOSTON PHILADELPHIA

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the advantages
of charcoal iron.

admiralty metal condenser tubes (Schedule 2484); until May 25, four motor-driven multiple-spindle horizontal boring mills (Schedule 2497) for Norfolk, Va., Navy Yard.

◀ SOUTH CENTRAL ▶

Buck Springs Distilling Co., Loretto, Ky., recently organized by L. C. Roberts and P. E. Moosmiller, has acquired former Buck Springs Distillery, and will remodel for new plant, including installation of new equipment. Cost over \$50,000 with machinery.

City Council, Magnolia, Miss., asks bids until May 28 for deep well motor-driven turbine pumping machinery and accessories, Diesel oil engine unit with auxiliary equipment, pipe lines, etc., for municipal water system. Henry A. Mentz & Co., Inc., Hammond, La., is engineer.

United States Engineer Office, Mobile, Ala., asks bids until May 21 for two watertube boilers (Circular 539).

Pan-American Distilling Corp., New Orleans, recently organized by Irving R. Saal, vice-president, Jackson Brewing Co., Wilkinson and Decatur Streets, and associates, plans new multi-story distillery. Company is arranging for sale of stock totaling \$403,000, a considerable part of proceeds to be used for purpose noted. Walter J. Trautman, 1501 American Bank Building, is president; Mr. Saal is treasurer.

United States Engineer Office, Vicksburg, Miss., asks bids until May 29 for one steel twin screw Diesel engine-driven towboat (Circular 290).

Town Council, Stevenson, Ala., plans installation of pumping equipment, pipe lines, etc., for municipal water system. Cost over \$25,000. J. B. McCrary Engineering Corp., Atlanta, Ga., is consulting engineer.

◀ SOUTHWEST ▶

United States Engineer Office, Postal Telegraph Building, Kansas City, Mo., asks bids until May 31 for electrical distribution system for No. 7 circuit and dredge feeders at site of new Fort Peck Dam, near Glasgow, Mont. (Circular 120).

McCormick Mercantile & Distillery Co., Waldron, Mo., Sen McCormick, head, plans new two-story distilling plant. Cost about \$45,000 with equipment.

Oklahoma Gas & Electric Co., Oklahoma City, plans new transmission line from Guthrie, Okla., to oil field district near Crescent City, Okla. Cost about \$35,000 with equipment.

City Council, Strong City, Kan., has plans for municipal electric light and power plant, using Diesel engine generator units. A fund of \$53,000 has been arranged through Federal aid. E. T. Archer & Co., New England Building, Kansas City, Mo., are consulting engineers.

Oil Well Supply Co., 497 Main Street, Beaumont, Tex., manufacturer of oil well drilling equipment, etc., has plans for one-story building for storage and distribution. Cost about \$25,000 with equipment. Headquarters are at Dallas, Tex.

Corpus Christi Refining Co., Corpus Christi, Tex., recently organized as a joint interest of Taylor Refining Co., Taylor, Tex., and Alamo Refining Co., Willow Springs, Tex., has acquired 12 acre tract in Avery Point district, Corpus Christi, and will soon begin erection of first unit of new gasoline refinery, including storage and distributing facilities. Cost over \$100,000. Later additional units will be built to cost close to \$200,000. J. F. Whitehurst is general manager.

Laredo Machine & Supply Co., Laredo, Tex., has been organized by K. D. Harrison and Donald Davers, both Laredo, to manufacture machinery and parts.

◀ MIDDLE WEST ▶

Rockford Screw Products Co., 2905 Ninth Street, Rockford, Ill., has let general contract to Linden & Sons, Inc., 1102 Tenth Street, for one-story heat-treating department, 50 x 96 ft. H. J. Eklund, 121 Seventh Street, is architect.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until May 22 for brackets, carriage bolts, crossarms, machine screws, rings, sleeves, etc. (Circular 59), galvanized iron hooks, ground rods, cable racks, cable rack hooks, etc. (Circular 60).

Plantetellus, Inc., 5307 Ravenswood Avenue, Chicago, has been organized by Earl L. Crabb and Lester J. Houle, to manufacture coin-operated machines and parts.

Common Council, Milford, Iowa, asks bids until May 28 for equipment for municipal electric light and power plant, and electrical distribution system, including Diesel engine-generator sets, fuel oil storage tanks, exciters, switchboard and instruments; also wire and cable, transformers, meters, etc., for distribution system. Fund of \$70,000 has been arranged. Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa, is consulting engineer.

Common Council, Independence, Iowa, plans extensions and improvements in municipal electric light and power plant, including installation of 500-kw. Diesel engine-generating set and accessories.

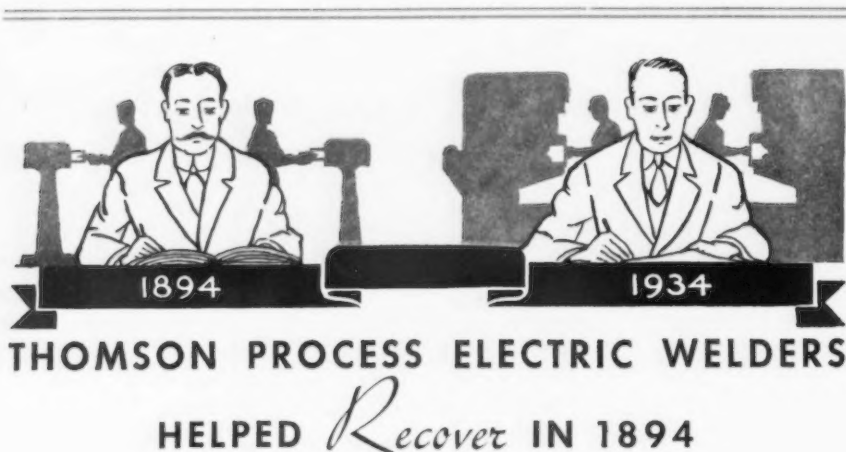
Central Screw Co., 3501 Shields Avenue, Chicago, has let general contract to E. L. Archibald Co., Inc., 111 West Washington Street, for one-story addition, 74 x 110 ft.

Northern Pacific Railway Co., Railroad Building, St. Paul, Minn., has plans for addition to engine house and shop at Missoula, Mont. Cost about \$30,000 with equipment. O. M. Rognan, address noted, is company architect.

◀ PACIFIC COAST ▶

Kingsland Granite Co., Rowell Building, Fresno, Cal., will soon begin erection of new fabricating plant, 125 x 300 ft., at Madera, Cal., where company has granite properties of over 1100 acres. Equipment also will be installed for quarrying, conveying, loading, etc. Cost over \$125,000. William A. Hubbard is vice-president.

Western Blind & Screen Co., 2700 Long Beach Avenue, Long Beach, Cal., plans rebuilding part of plant recently destroyed by fire. Loss about \$60,000 with equipment.



In 1886 Elihu Thomson invented the Thomson Process, the art of joining metals by electrical resistance. Since then, the company which he founded has continued to lead in the development and application of the Thomson Process.

During the industrial set-back of 1892-94, many metal working industries took advantage of the newly invented Thomson Process of resistance welding to reduce their costs and improve their products.

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If you join metals by any method, there is an excellent chance that Thomson-Gibb has electric welding equipment that will join them better, faster or cheaper. To find out, simply fill in the memo below and mail it attached to your letterhead.

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Thomson-Gibb Electric Welding Company
162 Pleasant Street, Lynn, Mass.

Gentlemen:

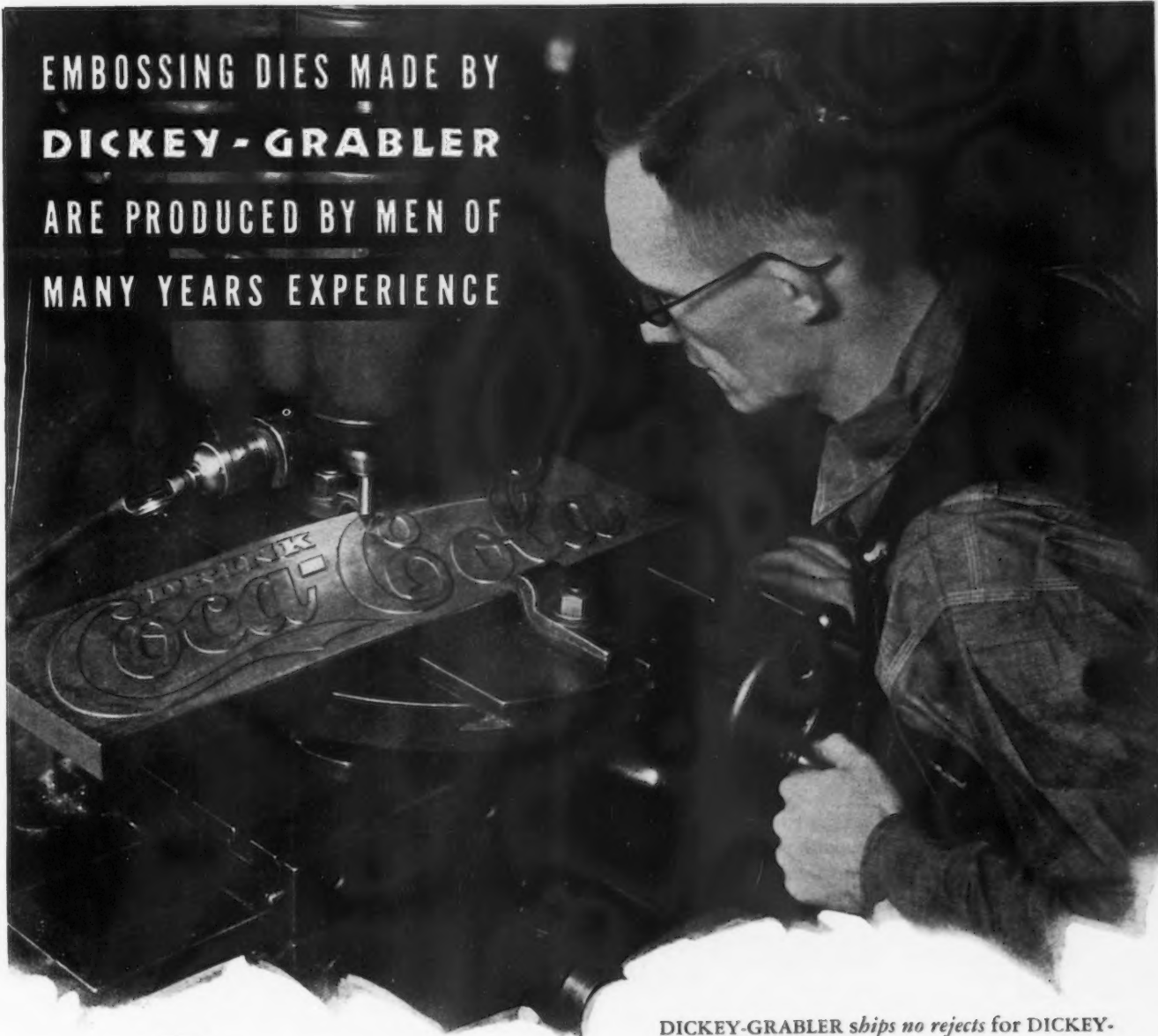
- ☐ Please ask your nearest engineer to arrange for an appointment at our plant.
☐ Please mail information on the welding of

Product Metal.....

Approximate dimensions.....

Desired production per hour.....6051

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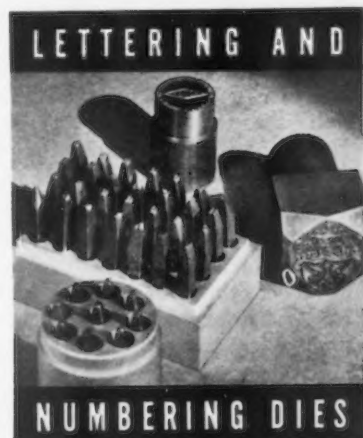
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Some order!—even for a versatile material. But we filled it by applying our 1314-X to the problem, and developing the proper characteristics in the steel to meet all these conditions successfully.

Results have shown that this steel measures close to SAE 1112 in machinability—gives high accuracy in finish, and an ample margin of safety over any maximum guarantee of service life.

You may have a similar question, involving a special steel for some unusual purpose—and we may know the answer. Correspondence invited.



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New Facts About Springs

(Continued from Page 21)

alloy, "Elinvar," a metal of substantially zero temperature effect on modulus, seemed to the Chatillon researchers more desirable from a commercial aspect.

A grave difficulty presented by both Invar and Elinvar is that neither is hard enough to be suitable material for weighing-springs. The elastic limit is less than 12,000 lb. per sq. in. in torsion instead of the more practical 60,000 lb. The problem eventual-

ly was solved by the invention of a material possessing suitable physical properties. The new material has been named Iso-Elastic (copyrighted by John Chatillon & Sons), the name being indicative of an alloy with constant elastic characteristics. By this material, which represents a new development in metallurgy, the temperature error, asserted Mr. Wasson, met with an ideal solution.

In dealing with the straight line

error, the research staff made an exhaustive mathematical analysis of the secondary bending effects in helical springs. The result indicated that a certain ratio must be maintained between the bending and the torsion characteristics of the wire. It was further found that this ratio can be obtained advantageously in a flat wire of rectangular cross section. Its major dimension and its minor dimension must be properly proportioned, each in respect to the other and both in respect to the diameter of the coil.

The ratio between the modulus in bending and the modulus in torsion is different for different metals, and to some extent for different degrees of cold work and for different heat treatments. But it appears mathematically that if these constants for the material can be determined, the geometrical form of the spring may be calculated; and the spring will possess straight-line behavior within less than 1 part in 6,000. With such a solution, trial and error hand correction of each individual scale becomes unnecessary. Further, machine coiled springs may be used with modern assembly-by-selection methods.

As Mr. Wasson pointed out, both the creep effect and hysteresis are caused by the departure from true elasticity of the materials from which springs are made. Given an alloy of truly elastic properties, the investigators were convinced that both the creep effect and hysteresis would vanish. In Iso-Elastic metal they found the qualities which virtually eliminate these two inherent errors, as well as the temperature error.

How the development of the new alloy came about may be briefly indicated as follows:

Bronze, heavily cold-worked and followed by time-temperature treatment, produces a spring more truly elastic than high carbon steel. For electrical measuring instruments such springs have been largely used in place of steel. The higher temperature coefficient of bronze is not disadvantageous in this field, because the permanent magnet in direct-current meters and the resistance of the winding have temperature effects which may be balanced against changes in the spring. Scale springs, however, have in the past been generally made from steel. Two methods are favored:

1. The usual scale-spring is heated, quenched and drawn after coiling the soft wire into the form for the final spring.

2. Many mechanical springs are coiled from oil-tempered spring wire; those of small size being made from



The editorial department of "Product Engineering" recently conducted a survey among 430 manufacturers in the metal working field relative to their activities in product development. The results indicated that, since the importance of price has been greatly reduced as a selling factor, intensive design work is going on everywhere to the end of increasing the quality of products to the highest possible degree.

Design activities were aimed, among many others, at the following product improvements: Greater precision in use. Better electrical control and accessories. Better springs. Adoption of materials for high stresses, high strength-weight ratio, and greater resistance to corrosion, wear, abrasion, high temperature, impact, vibration and fatigue.

In order to achieve product improvements of that nature, Engineers are replacing cheaper and less efficient metals with such alloys as Phosphor Bronze, Nickel Silver and

Beryllium Copper. The selection of these more refractory non-ferrous metals is based upon the following reason: The advantageous chemical, physical and metallurgical characteristics of Phosphor Bronze, Nickel Silver or Beryllium Copper, respectively, cannot be obtained in any other ferrous or nonferrous metal.


This Company has prepared reference booklets on the subjects of Phosphor Bronze, Nickel Silver and Beryllium Copper which will enable manufacturers to determine how these metals can contribute towards increasing the quality of their products. To this end, the various alloys of Phosphor Bronze, Nickel Silver and Beryllium Copper, in all the forms produced by this company, their characteristics and the purposes for which they are now used, have been explained in detail. You are invited to send for the booklet covering the subject matters in which you are interested.

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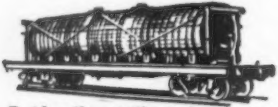
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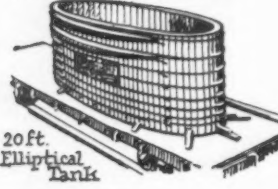
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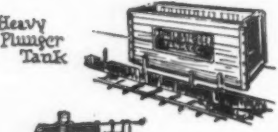
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music wire, or phosphor bronze. When heated after coiling, these springs approach the quality of the quenched and drawn type.

The desirable properties of cold drawn and after-heated spring led to close investigation of this method. Contrary to general belief, it became evident that most alloys capable of being cold drawn—such as duralumin, bronze, and monel—would form springs of excellent elastic properties if the proper cold working was followed by correct after-heating.

Rigid control of each step in production, of course, was necessary to obtain optimum quality. Analysis, melting, pouring, forging, hot and cold working, and the final methods of after-heat treating all had to be guarded with extreme care.

Pursuing these methods with both Invar (36 per cent nickel and the remainder iron) and Elinvar (36 per cent nickel, 12 per cent chromium, and the remainder iron), the advantages and disadvantages of these two alloys, described above, were established. By the addition of elements to the Guillaume discoveries, and by improving the methods of control, the investigators eventually invented the Iso-Elastic metal.

The creep error of Iso-Elastic springs under stresses of 60,000 lb. per sq. in. in torsion is found to be less than 1 part in 5,000 as compared with 25 parts in 5,000 for ordinary spring steel. Its hysteresis error is also less than 2 parts in 5,000, as compared with an error three or more times as great for good steel. As has been stated, the modulus change of Iso-Elastic springs is negligible under wide changes of temperature. And these springs have shown no fatigue after a million rapidly repeated deflections.

While, from the broad view of industry and from the scientific view, the perfection of the helical spring was the most interesting feature of the Chatillon research, this by no means completed the investigation. Having discovered how to produce Iso-Elastic springs as the resisting system, the investigators then developed a new type of scale mechanism to utilize the springs to full advantage. This phase of the research entailed a radical revision in manufacturing practices, in which the accurate tools of mass production were substituted for the methods of an industry in which highly skilled handicraft had formerly been unavoidable. The problem here was to devise the entire apparatus—consisting of transmitting and indicating systems and including pinions, racks, and dials, so that it

would accurately meet conditions of no load, part load, and full load.

To avoid the so-called "parallax error" which occurs when a scale-user reads the pointer at an angle, the graduation marks are on a dial surface elevated to the same plane as the pointer.

Among the developments of accessories to the new scale is a dash-pot used to cushion the shocks of sudden loads and to bring the scale pointer to full stop within a second of time. This dash-pot is believed to have applications other than in weighing apparatus.

The research was originally suggested to George E. Chatillon by S. G. Averell, consulting engineer, both of whom followed the progress of the work from its inception. Robert B. Wasson was the engineer in direct charge. Dr. A. V. de Forest, consulting metallurgist, New York, specialized on metallurgy and treatment. Prof. Mortimer Sayre, Union College, Schenectady, N. Y., handled the theoretical phases of the investigation. The Baldwin Southwark Corp., manufacturer of hydraulic testing machines for laboratory use, has adopted the springs as standard equipment in the force measuring and indicating apparatus, following an investigation of them by Dr. G. S. von Heydekampf of that company's engineering staff.

Choosing the Right Drive

(Continued from Page 25)

- 2—Reduction in the size of transmission equipment.
- 3—Considerable economy in current consumption where starting and stopping is frequent.
- 4—The possibility of using smaller size and cheaper type motors, because the motor is permitted to accelerate to full speed before the full load is applied.
- 5—The possibility of the motor developing its full torque, thus eliminating the need for selecting a motor greater than the required running horsepower to obtain sufficient starting-torque.
- 6—Considerable reduction in starting shock.
- 7—Smooth acceleration.
- 8—Value as an overload release.

Summarizing these advantages, it is obvious that clutches and couplings of this character can be applied on equipment having a large WR 2, as would be the case in installations having fly-wheel effect and large, heavy rotating members within the driven unit. They can also be applied to conveyors and elevators.

Devices of this character are effective as safety devices in case of overload. If complete stoppage of

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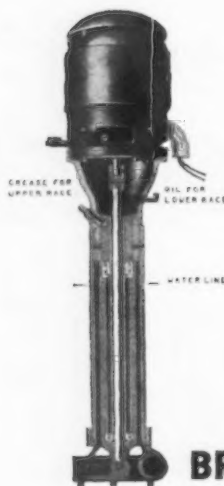
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EFFICIENCY.....

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the driven equipment occurs, the clutch must stand slippage at full motor speed and the average high starting-torque clutch available will stand this for one or two minutes at least. In the case of peak loads only, the differential in speed is comparatively small, therefore the time allowed is materially increased. A minute is a long time for a machine to be motionless without it being noted by the operator. In certain installations, if this occurred and the driven equipment was down for a longer period with the motor running, the lining or other mechanism of the clutch are liable to destruction. However, the expense of clutch part replacement is small compared to the possible damage that might occur in various parts of the driven equipment if a clutch of this character were not employed.

It is probably well understood that the current consumption of a motor running at full speed and developing full torque is much less than the current required to develop the same amount of torque at starting and acceleration. The high starting-torque clutch or coupling permits the motor to accelerate almost immediately to full speed and thus it goes to work in a more efficient manner. By the use of these devices, the motor is brought to an efficient operating speed quickly, therefore the motor does not drag through a long starting period as would be the case in a direct positive connection between the motor and driven unit. Furthermore, these results are accomplished without any elaborate electrical control. There are

installations, however, where wound rotors are used such as in the "slip ring" type of motor. In many cases of this character, the high starting-torque clutch or coupling eliminates the need for this class of motor and thereby permits the use of the standard squirrel-cage type with considerable saving in starting equipment.

The "magnetic" clutch for general friction-clutch functioning and the gradual acceleration of heavy starting loads has been available for several years, but it has not been extensively employed until a comparatively recent period for reasons which may be summarized as follows:

- 1—The absence of research in developing new designs for particular needs.
- 2—The supposedly limited application for a clutch of this character.
- 3—The comparatively high initial cost.
- 4—The small amount of advertising and publicity given to it.
- 5—The necessity of direct current for energization.

Practically all of these can be attributed to the fact that up to approximately ten years ago, there was virtually only one manufacturer building such a piece of equipment. However, with the advent of other manufacturers into this field, considerable advance has been made in the art and a great many applications, heretofore considered impractical and impossible, have been successfully accomplished.

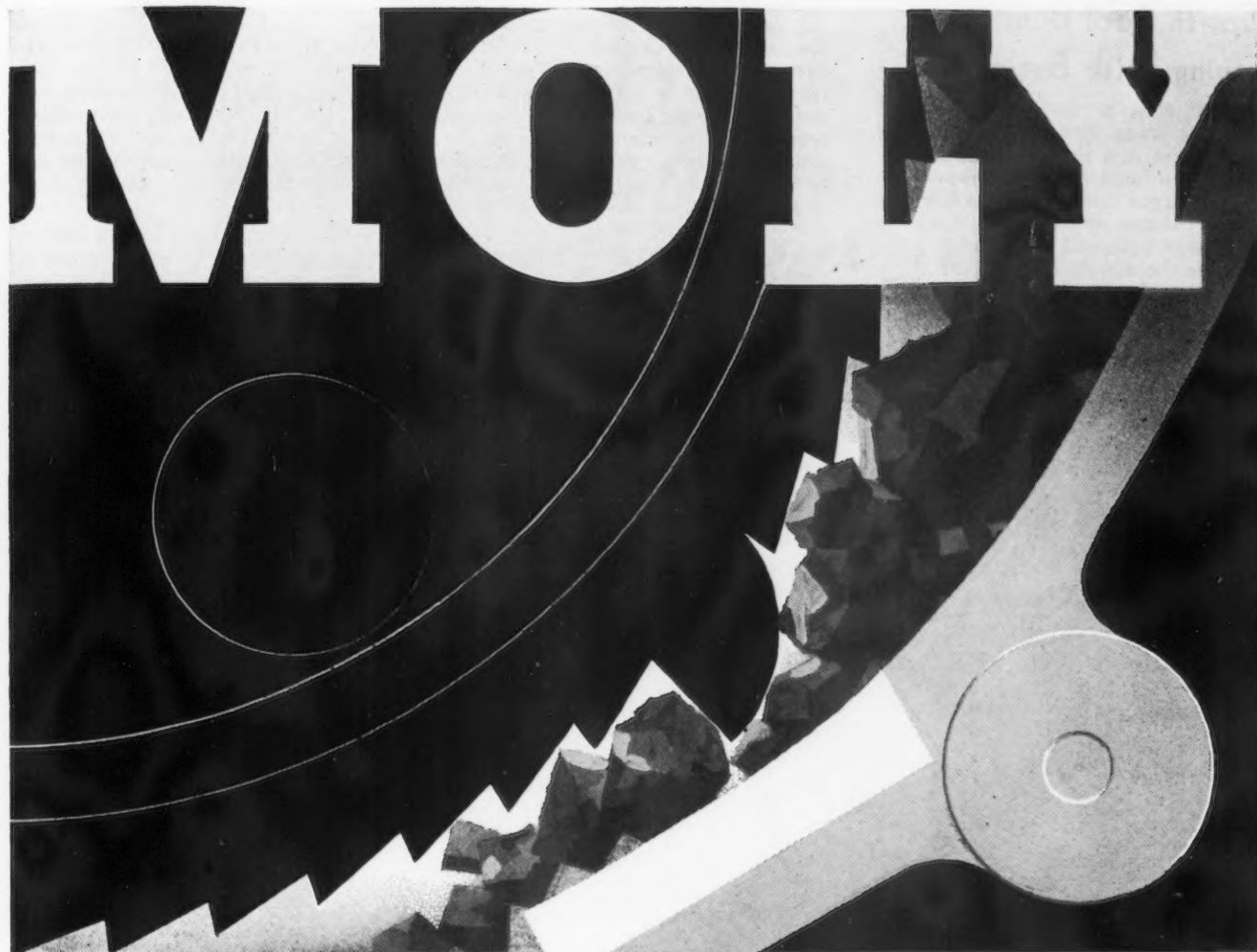
The salient features of the magnetic clutch can be classified as follows:

- 1—Automatic or manual electrical control can be applied, either local or remote, in every conceivable manner.

- 2—Smooth acceleration is assured based on the nature of the device.
- 3—With exception of slight wear on the friction lining, there is virtually no other maintenance.
- 4—The inherent characteristic of simple installation and alignment.
- 5—Easy adjustment and replacement of the lining when necessary.

It is evident from these features that the magnetic clutch is a suitable mechanism for the gradual acceleration of high starting-torque machinery when interposed between the prime mover and the load, particularly where the load must be connected after the motor is up to speed. The magnetic clutch differs from the average high starting-torque mechanical couplings in that it must be electrically energized before gradual load acceleration can occur. There are numerous cases where a high starting-torque load connection follows full motor speed; therefore, for this service, if the comparatively high initial first cost of the magnetic clutch can be justified, a satisfactory return on the investment is assured based on the salient features enumerated.

The modern magnetic clutch is essentially a multiple disk friction clutch actuated by a powerful electro-magnet. All toggles, links, yokes, and shifters are dispensed with. The clutch consists of two elements, one the electro-magnet, the other the friction device. The magnet element is energized by closing the electric circuit, either by a push-button or by some other control. The pull of the magnetic forces on the armature is transmitted to a pressure ring of the clutch while the friction linings are pressed between the pressure ring and an adjustable ring. The frictional forces developed in this manner cause the driven member to be accelerated. The forces required to operate a clutch of this character are balanced within the driving member; therefore, no end thrust is transmitted to the shaft during its engagement or disengagement. The armature and magnet being contained in the driving member, there is no relative rotation between them. Thus, the danger of scoring the magnet faces when the linings become worn is eliminated. When the electric current is disconnected, the magnetic field subsides and the armature and pressure rings are instantly disengaged. The power ratings of magnetic clutches range from fractional to 1200 hp. and higher at 100 r.p.m. with pounds-foot torque capacities to suit requirements. Fractional and moderate horsepower capacities are of the single disk type, while for the higher powers the multiple disk type is employed.



toughens white iron

"WHITE IRON" sometimes means trouble to the foundryman. His hard castings often crack in the mold — in transportation — or prematurely in service.

Molybdenum additions toughen the carbides in white iron. Some malleable iron producers add .15% to .25% of Molybdenum just to insure a reasonable recovery of their intricate hard castings. A 64-inch mill liner is being made of a .75% "Moly" white iron where heretofore it had been impossible even to install the unalloyed hard liner without breaking it.

Molybdenum also increases white iron's wear resistance. A .50% Molybdenum addition to a ball mill liner increased its life from 120 to 165 days.

A new Molybdenum alloy combination has been developed which permits the production of white iron with hardnesses as high as 700 Brinell without developing prohibitive brittleness. An extremely hard chill with a tough machinable backing is also easily accomplished with other analyses developed by Climax metallurgists.

Moly's versatility for improving steel and iron offers a story of unusually broad scope. *Write for our latest booklet on Molybdenum.* Lay before our free engineering service your particular alloy problems. Let the modern Climax laboratories in Detroit assist you in any tests or experiments you may wish to make. Climax Molybdenum Company, 295 Madison Avenue, New York City.

CLIMAX Mo-lyb-den-um

British Tool Builders Doing Brisk Business

THE close of the first quarter of 1934 finds British machine tool makers in a prosperous condition, reports to hand indicating that some of the larger Coventry firms have an ample backlog of orders and that the near-term prospects are bright.

Since the middle of last year there has been a decided up-swing in British industrial activity and the local machine tool industry has benefited accordingly. The British automotive industry has been particularly active,

production figures for 1933 establishing an all-time high record. One of the largest producers of low priced cars (Austin Motor Co., Ltd.) has taken on close to 3000 additional mechanics since the turn of the year and this month has been advertising for additional hands. This firm has lately been buying machine tools at the rate of £6,000 per week, its total post-war expenditures for such equipment being estimated at £15,000,000. Railroad shops, aircraft builders, general engineering firms and other large users of machine tools are also busier than they have been for a long time past.

Naturally British machine tool builders are getting the bulk of the business resulting from the general industrial revival. However, it is worth noting that American machine tools, long neglected because of their high cost due to sterling devaluation, are again coming into their own. In other words, the recent revaluation of American currency has eliminated the exchange handicap which began to operate against American exports when sterling left the gold standard. One resident American sales representative reports that 1933 sales of his particular specialty product were 22 per cent ahead of 1932 and that the first two months of 1934 show an increase of 38 per cent over the corresponding period of last year.

One of the largest units in the American machine tool industry has

recently decided to manufacture its products in this country, and with this end in view is now erecting a modern factory at Birmingham. Upon completion of the premises about next June, the firm will begin the production of hydraulic manufacturing milling machines and advanced knee and column type machines not at present made in the United Kingdom.

While British machine tool makers have been doing a steadily expanding trade in their home market, they have been consistently losing ground in foreign markets. Imports amounted to £1,615,790, £968,379, and £848,661 in 1931, 1932 and 1933 respectively. Exports on the other hand were £2,237,457 in 1931, £3,144,124 in 1932 and only £1,266,780 in 1933. Details of British machine tool trade are shown in the accompanying tables.

Later statistics, those for the first two months of 1934, show a rising trend with respect to British imports, but a sharp drop in exports, especially to Soviet Russia.

	IMPORTS (£)		
	1932	1933	1934
	Jan.-Feb.	Jan.-Feb.	Jan.-Feb.
Totals ..	267,260	131,381	209,150

	EXPORTS (£)		
	1932	1933	1934
	Jan.-Feb.	Jan.-Feb.	Jan.-Feb.
To Soviet Russia	424,353	194,080	25,833
Total ..	511,177	303,024	158,809

An analysis of the foregoing statistical tables plainly suggests that Britain's abandonment of the gold

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IMPORTS AND EXPORTS OF MACHINE TOOLS BY GREAT BRITAIN

EXPORTS			
	1931	1932	1933
	£	£	£
Machine Tools			
Drilling	413,749	447,789	
Grinding	251,999	366,633	
Lathes	781,853	1,105,197	Details
Milling	234,899	219,280	not
Planing and Shaping	138,625	423,703	avail-
Presses, punching and shearing machines.....	104,080	180,260	able
Other machine tools	306,038	388,322	
Chucks and other machine tool parts.....	6,214	12,940	
Total	2,237,457	3,144,124	1,266,780
To Soviet Russia.....	1,434,207	2,552,947	623,314
Other European countries.....	264,359	139,713	159,684
British Africa.....	71,594	37,858	62,490
British India.....	200,326	150,878	139,093
Australia	14,719	12,656	43,754
Other countries.....	252,252	250,072	238,445
Total	2,237,457	3,144,124	1,266,780
IMPORTS			
	1931	1932	1933
	£	£	£
Machine Tools			
Drilling	130,014	52,861	
Grinding	197,149	137,618	
Lathes	234,417	114,366	Details
Milling	128,617	86,155	not
Planing and shaping	83,063	57,453	avail-
Presses, punching and shearing machines.....	440,980	168,724	able
Other machine tools	384,089	339,335	
Chucks and other parts.....	17,461	11,867	
Total	1,615,790	968,379	848,661
From			
Germany	541,971	357,536	Details
United States.....	982,225	467,328	not
Other countries.....	91,594	143,515	available
Total	1,615,790	968,379	848,661

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50%

Production Increase
1/2" Round, Cold Drawn
J & L Improved,
S.A.E. 1112



20%

Faster Cutting
5/16" Round, Cold Drawn
J & L Improved Special High
Sulphur Screw Steel



20%

Faster Cutting
7/16" Round, Cold Drawn
J & L Improved Special High
Sulphur Screw Steel



20%

Production Increase
1/4" Round, Cold Drawn
J & L Improved
S.A.E. 1112



15%

Longer Tool Life
3/8" Round, Cold Drawn
J & L Improved Special High
Sulphur Screw Steel



10%

Production Increase
1/2" Round, Cold Drawn
J & L Improved
S.A.E. 1112



9%

Production Increase
3/8" Round, Cold Drawn
J & L Improved
S.A.E. 1112

J & L Improved BESSEMER SCREW STEEL

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Longer tool life, less down time, faster cutting, increased feed, better appearance—these are the results being reported from the use of Jones & Laughlin Improved Bessemer Screw Steel. The radically improved machining quality of this stock is responsible. The increased ma-

chinability is found in both S.A.E. 1112 and J & L Special High Sulphur Bessemer Screw Steel, in hot rolled bars, cold finished bars, and drawn wire. Investigate the possibilities of this stock in the light of your requirements. A descriptive bulletin will be sent on request.

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standard late in 1931 was of material benefit to the local machine tool industry, that is to say, depreciated sterling checked imports into the United Kingdom while at the same time greatly stimulating exports. It is also worth noting that British exports to Soviet Russia accounted for 63 per cent of total exports in 1931 and 80 per cent in 1932, whereas in 1933 they fell off to 50 per cent, and in the first two months of 1934 amounted to barely 16 per cent. It seems reasonable to suggest that four factors are responsible for this sharp decline in Anglo-Soviet trade, viz.:

(1) completion of the Soviet Five-

Year Plan with a consequent slackening of machine tool imports; and

(2) Anglo-Russian political relations. The trade treaty between the two countries was abrogated in 1933 and a new agreement has only recently been negotiated;

(3) resumption of diplomatic relations between America and Russia, and

(4) the revaluation of the American dollar at a level relatively lower

than that ruling for sterling exchange.

In addition to its bearing on Anglo-Soviet trade this last factor is markedly influencing Anglo-American trade, that is to say, American machine tools are once again available in the British market at attractive prices.

SOURCE: Quarterly Report on British Machine Tool Industry, dated March 28, 1934, No. 12538, submitted by American Consul George A. Makinson, Birmingham, England.

Procedure in Oxy-Acetylene Welding of Cromansil Steels

IN welding Cromansil steels the procedure as well as the choice of welding rod depends upon the thickness of the sheet, according to the March issue of *Oxy-Acetylene Tips*, published by the Linde Air Products Co., New York.

For thin sheets, $\frac{1}{8}$ in. and less in thickness, forehand welding, in which the flame points toward the unfinished part of the seam, is recommended. By this technique better control of the weld and greater speed are possible. On sheets and plate up to $\frac{1}{4}$ in. in thickness high test steel welding rod is recommended. The volume of the deposited rod is relatively small, and the alloys received from the melted base metal strengthen the steel from the rod sufficiently to produce weld metal strength equal to that of the base metal.

On material $\frac{3}{16}$ in. and heavier, the plate is beveled to a 70 or 90 deg. bevel as shown in the accompanying table and in this case the backhand method of welding, in which the flame points toward the finished part of the seam, is advised. Control of the fusion in the bottom of the weld and along the sides of the scarf is easier to obtain with backhand welding; also the hot gases pass back along the completed portion of the weld and retard the cooling, with consequent reduction in hardening of the weld and adjoining base metal.

Conditions recommended for oxy-acetylene welding of Cromansil steel are set forth in the following table:

Plate Thickness, In.	Welding Rod Diam., In.	Welding Tip, No.	Oxygen Pressure, Lb. per Sq. In.	Bevel, Deg.
$\frac{1}{16}$	$\frac{1}{16}$	4	10	None
$\frac{1}{8}$	$\frac{1}{8}$	5	12	None
$\frac{3}{16}$	$\frac{3}{16}$	7	16	90
$\frac{1}{4}$	$\frac{3}{16}$	8	19	90
$\frac{3}{8}$	$\frac{1}{4}$	10	21	70
$\frac{1}{2}$	$\frac{5}{16}$	12	25	70
$\frac{3}{4}$ and over	$\frac{5}{16}$	15	30	70

*Welding tip sizes and oxygen pressures are for Oxweld type W-1 blowpipes. For other blowpipes, use equivalent tip sizes and pressures.

When welding material over $\frac{1}{4}$ in. thick, it is better to use an alloy rod of manganese-molybdenum steel because the volume of the weld metal is great enough so that the base metal melted into the weld would not supply enough of the alloys to give the desired strength to weld metal obtained from high test steel welding rod.

Smaller sizes of welding tips are recommended for overhead and vertical welding and the extent of change will depend somewhat on the experience and skill of the operator in making these types of welds.

Overheating of the melted weld metal should be avoided, especially when the Cromansil steel contains 0.25 per cent carbon or more. If the welder has difficulty with overheating, a smaller tip than that recommended can be used. For these higher carbon Cromansils, normalizing the weld at a temperature of 1650 deg. F. will give the best results.

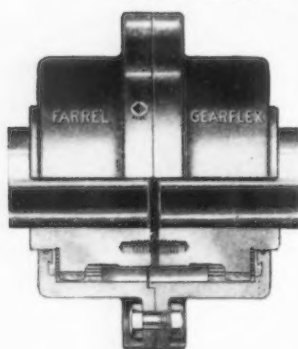
Experience has shown that properly made welds will have even greater strength than 0.10 carbon Cromansil base metal, and the ductility will be such that in the free bend test the per cent elongation in the outside fibers will be on the order of 30 per cent. In the 0.20 per cent carbon Cromansil steel, the strength of the welds when made properly will be about the same as the base metal, and the elongation in the bend test about 20 per cent.

American Steel Foundries, Chicago, had net loss in the first quarter of \$201,027 which is less than half of the loss in the corresponding quarter of 1933.

Link-Belt Co., Chicago, in the quarter ended March 31, had net income of \$118,077, equal after dividends on the $6\frac{1}{2}$ per cent preferred stock to 7c. a share on outstanding common stock. Sales to customers totaled \$2,140,424, against \$1,419,246 in the first quarter of last year.

Allegheny Steel Co., for the quarter ended March 31, had net profit of \$293,954 after depreciation, Federal taxes and other charges. This compares with net loss of \$131,937 in the first quarter last year.

OIL FILM Carries the Load!



In the Farrel Gearflex Coupling the load-carrying surfaces are the teeth of the external and internal gears protected by an oil film which provides a cushioning effect, giving silent operation, trouble-free service and long life.

The floating sleeve is carried on the crowned tips of the external teeth of the hubs, permitting free movement of the sleeve. The end flanges support no part of the coupling; their only function is to provide a durable seal to retain oil inside the coupling and exclude dust, grit and moisture.

Other advantageous features are described in Bulletin No. 437. Send for your copy today.

FARREL-BIRMINGHAM
COMPANY, INC.

333 Vulcan St., Buffalo, N. Y.

MISTAKE

IN TESTING PROVES HIGH QUALITY OF SHIELDED ARC WELDING

Upon completion of an order for 102 shielded arc welded tanks, the fabricator was ordered to test them at 25 lbs. pressure. The tester thought he was told to test at 125 lbs. pressure . . . the above photograph shows the result of the big mistake. Each head of the tank bulged outward 6 inches, creasing the shielded arc weld as shown . . . but no leaks or fractures occurred.

Again an actual test definitely proves the greater strength and greater ductility of welds made with "Shield-Arc" welders and "Fleetweld" electrodes. Not only does this Lincoln equipment produce welds of 65,000 to 75,000 lbs. per

"Look here, Lad—these shielded arc welds withstood 5 times normal testing pressure."

"Sure, Pop—and it costs less to weld with a shielded arc."



sq. in. tensile strength with ductility equal to mild steel, but the welds also have greater resistance to fatigue, impact and corrosion.

You pay no more for these higher quality welds . . . in fact, they actually cost less than ordinary welds because with Lincoln equipment you weld much faster. Before you buy any welding equipment find out how much Lincoln can save you.



LINCOLN

NEW IN WELDING
"Lincontrol"
—remote control without
extra cables or portable
accessories. Write for
bulletin.

W-69

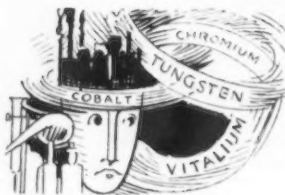
THE LINCOLN ELECTRIC COMPANY, Largest Manufacturers of Arc Welding Equipment in the World, CLEVELAND, OHIO

"SHIELD-ARC" WELDERS AND ELECTRODES

Just Between Us Two...

Hel-lup! Hel-lup!

A SUBSCRIBER wants to know who makes Vitalium, a new alloy, said to be composed of cobalt, tungsten and chromium. Shamefacedly, we admit we don't know. If you know, a letter addressed to Reader Service Dept., The Iron Age, 239 W. 39th St., New York City, will win for you our undying gratitude, if that means anything.

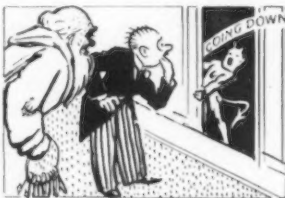


We Hate 'Em

NEXT to the bird who has his stenographer get us on the telephone and they make us wait until he gets good and ready to talk to us, our favorite object of hatred is the salesman who has a bad rush of ethics to the head. We refer to the individual who assumes a coy look every time you mention a competitor's goods, and who says piously, "I never knock a competitor."

If a man is selling a certain product naturally you expect him to know more about it than you do. If he is a good salesman he not only knows his own goods, but his competitors' as well. Naturally you expect expert advice that will enable you to make the best selection. But all Holy Joe keeps parroting is, "I never talk about a competitor."

If he has to live on his commissions he'll soon be knocking at the pearly gates. We hope St. Peter does well by him.



Now We Know What a Welkin Is

WHEN we asked Mr. John Frew, the cultured, quiet gentleman who draws the cartoons that adorn this column, if he wanted any suggestions for subjects, he answered haughtily, "No, every suggestion implies a limitation." Neatly put, we thought.

He seemed horrified at our ignorance of "welkin." According to him it's the vault of the sky, and, to our disappointment, Webster agrees.

Cut Yourself a Piece of Pie Chart

THESE are the days when all God's chillun got statistics, showing how much better they are today than they were this time last year. The air is blue with pie charts, bar charts, curves, and such. Of course, there's a joker in the comparisons. Business in the first four months of 1933 was lower than the proverbial snake's belly. The first four months of this year had to be better. Or else.

So comparisons don't mean anything. But who are we to stand aloof and refuse to toss a statistic into the air to fall to earth we know not where (proving that Miss Gibbs, the homely woman with the wart, who taught the sixth grade, was all wet when she said that there was no poetry in our soul, because we always fell asleep during the Longfellow session)? Here's our entry (to be read in a dull monotone): In the first four months of 1933 The Iron Age welcomed 696 new subscribers, as compared with 1,207 in the same period of 1934. A gain of 73 per cent. (Applause.)

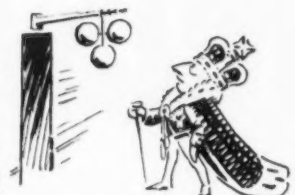


Royalty at Ebb Tide

FROM the "Public Notices" column of the May 4 New York Herald Tribune:

SIR VAN DE RENNE FERDINAND OLSZEWO, province of Posen, distr. Kosciel, Poland, will give his title noble for payment. Be so kind to send the condition to the address in this document.

VERSATILE Prince, English culture, desires business connection. Chelsea-3-1133.



A plain-spoken man is Sir Olszewo. He minces no words. You pays your money and you gets your title. We could use a prince if his versatility includes checking subscription records, curing a slice, and mixing a Martini that tastes like something else than white shoe cleaner with a dash of Flit.

Phidias Had a Word for it—"!!?!/!!"

THE most unusual photograph that has graced the pages of this family journal within our memory appeared on page 69 of the May 3 issue, in The Seymour Manufacturing Company's advertisement. A sculptor and a marble seller, both in togas, argue about the quality of a certain shipment of marble. To the right of the photograph is a present-day metal spinner, clad in conventional shirt and pants, gazing approvingly at a vessel spun from Seymour Nickel Silver.

A clever conception, for which, congratulations, Seymour!

ESTABLISHED 1896

GLIZBE BROTHERS
MANUFACTURING COMPANY

PLAIN AND BALL BEARING GRINDERS, COUNTERSHAFTS AND POLISHING LATHES
MOTOR DRIVEN GRINDERS, RING GRINDING AND PLAIN BEARING HANDRELS

TELEPHONE 651
PLYMOUTH, IND.
4-30-34

The Iron Age
239 W. 39th St.
New York City, N.Y.

Gentlemen:

For years we have been a subscriber and reader of The Iron Age. We have found it very helpful in our line of manufacture and would not want to do without it. As a trade journal, we recommend it most highly.

Yours very truly,
Glizbe Bros. Mfg. Co.
By *[Signature]*
J. A. Brown, Treas.

Attn: Mr. Arthur W. Dix, Reader Serv. Dept.

JAD:10

NRA
NATIONAL
REVENUE
ACT

Statistic

If all the copies of The Iron Age representing the thousand and odd gain in circulation since July were piled one on top of the other they would probably topple over.



He Used a Wheelbarrow

A. W. GLESSNER, president of The Excelsior Steel Furnace Co., Chicago, writes:

"My earliest call at the office of The Iron Age was in June, 1883, when it was located on William Street near the Brooklyn Bridge, which was under construction at that time. I met at that time Mr. David Williams who mentioned having delivered the first issue of his publication to the post office in a wheelbarrow."



David Williams was the man who first published The Iron Age in 1855, in Middletown, N. Y. Judging from the legends we later Iron Agers hear of his tireless energy, he must have had a highly active pituitary gland. We wish we could get a shot of it right now, for with the temperature at the unseasonable height of 85 deg., we have an attack of spring fever which we fear is going to last all summer. Thank God we don't have to push any wheelbarrows!

He Never Heard of Us

"BELIEVE it or not," writes Clifford G. Bond, one of our representatives, "I talked with a man today who never even heard of The Iron Age."

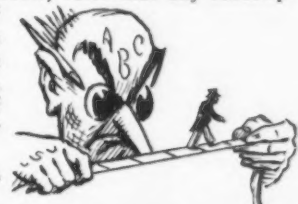
The same individual probably believes that Crosby Field, vice-president of the Brillo Manufacturing Company and a valued reader, is an airport.



Most people we run into, even outside the industry, claim acquaintance. Only the other day we bought in Macy's a pair of Dr. Locke's trick shoes, which are said to be kind to bunions. The light of recognition we thought we saw in the salesman's eye was probably imagination on our part, for the package came addressed to us care "R. & H. Publishing Co." They ought to tell that blonde at the necktie counter that an osculator is something different from a traveling stairway.

Blurb

THE Audit Bureau of Circulations, whose eagle-eyed auditors keep us on the straight and narrow, rules that any subscription paid for within six months of expiration is a renewal. Which is why we have to go so far back in concocting this statistic. Anyway, from July to October, 1933, 2,663 of our subscriptions expired. And how many do you suppose renewed? Over two thousand! To be exact, 2,003.



Of the 660 recalcitrants, some died, some went out of business, and some just plain got tired of us. But 2,003 out of a possible 2,663! Pardon just a little boast. A paper has to be good to make that showing.

We'll Take in Each Others' Washing

WITH so many people spending their time in code conferences, we can't figure out how there can continue to be a labor surplus. When all the codes are enacted, the immigration bars will probably have to be lifted so that there will be someone to do the productive work, for the present population will all be engaged in code enforcement.



YOU CAN REACH

50,000 METAL-WORKING EXECUTIVES

AT A COST OF LESS THAN A QUARTER OF A CENT A READER

If you sell a product used in plants making metal goods, you can gain the favorable attention of executives with buying power in these plants at a very low cost by advertising in The Iron Age.

A full page once a month on a yearly basis costs only \$116 per insertion, a half-page \$60, quarter-page \$31.

The Iron Age is the most widely read paper in this great industry. Use it to increase your sales.

THE IRON AGE

239 W. 39th STREET, NEW YORK, N. Y.

READER INTEREST INVESTIGATIONS

(NO. 2 OF A SERIES)

Manufacturer's Product: Transmission Belting.

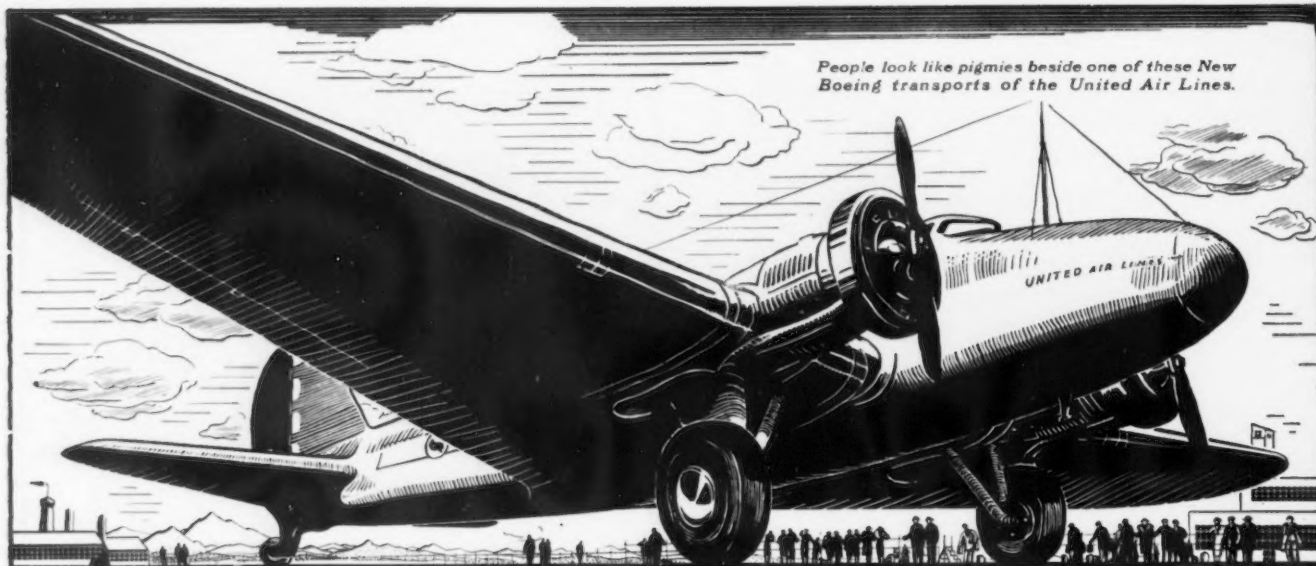
Purpose of Investigation: This manufacturer needed to know which publication stands highest among the men of the metal-working industries.

Method of Conducting Investigation: The manufacturer wrote letters to some hundreds of men asking them frankly which publication they prefer.

Results:

The Iron Age	216 Votes	
2nd Publication	199 "	
3rd	166 "	
4th	143 "	

That The Iron Age Leads Is Not Surprising
—It Has 50,000 Readers!



People look like pigmies beside one of these New Boeing transports of the United Air Lines.

Seventy...

3-MILE-A-MINUTE BOEINGS

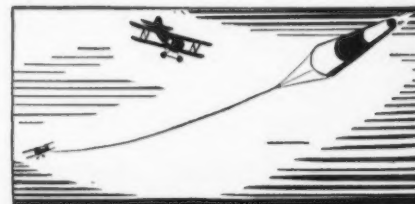
World's largest fleet of high speed multi-motored passenger planes equipped with Roebling Control Cable to insure utmost safety

NOW YOU can travel like a shot ...3 miles a minute! California to New York... in 19½ hours! United Air Lines new fleet of 70 Boeing Wasp-powered transports makes this possible.

Just imagine yourself as one of the two pilots at the controls of one of these air giants...

speeding through the air...a mile in almost 20 seconds! You would want to feel mighty sure of those control cables!

And this is how Boeing felt about it...when they designed these planes. So they equipped all 70 with Roebling Control Cable.



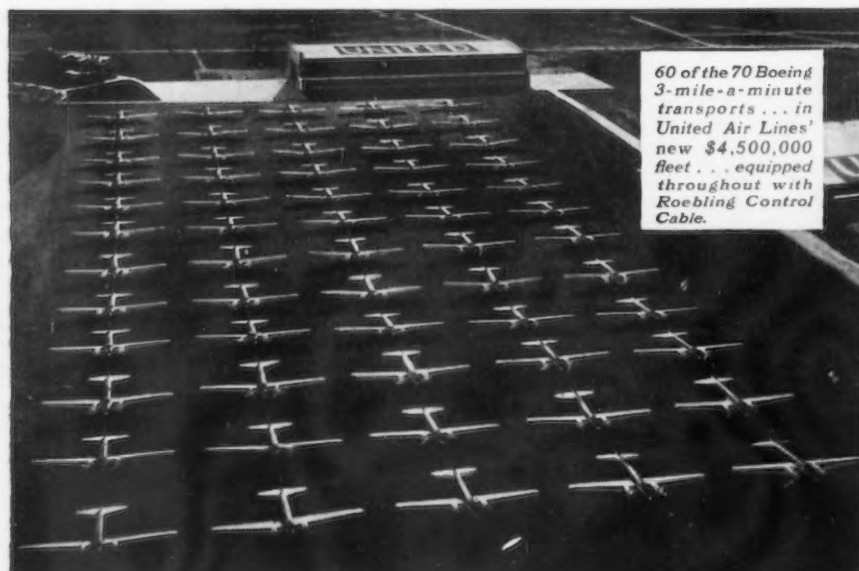
Target-towing...an interesting and severe use for Roebling Control Cable. Only ¼ in. in diameter, this tough cable has an ultimate strength of 1 ton.

You may not use Roebling Control Cable. But you can get the same stamina and safety in other Roebling Wire Products...including Wire Rope. Through the use of these products you have positive assurance of the utmost of dependability and economy in service.

WIRE ROPE FOR ALL NEEDS...
LARGE OR SMALL: No matter how exacting the service, or how large or small the order may be, Roebling can meet your requirements. And your order will receive the same careful, prompt attention, whether for a carload of rope or merely a few feet. John A. Roebling's Sons Company, Trenton, N.J. Branches in Principal Cities.

ROEBLING

The Pacemaker in Wire Rope Development



60 of the 70 Boeing 3-mile-a-minute transports... in United Air Lines' new \$4,500,000 fleet... equipped throughout with Roebling Control Cable.